Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Supporting Information

Asymmetric Amination of 2-Substituted Indolin-3-ones Catalyzed by Natural Cinchona Alkaloids

Jing Guo,[a] Zi-Hui Lin,[a] Kai-Bin Chen,[a] Ying Xie,[a] Albert S. C. Chan,[a] Jiang Weng,[a,*] and Gui Lu[a,*]

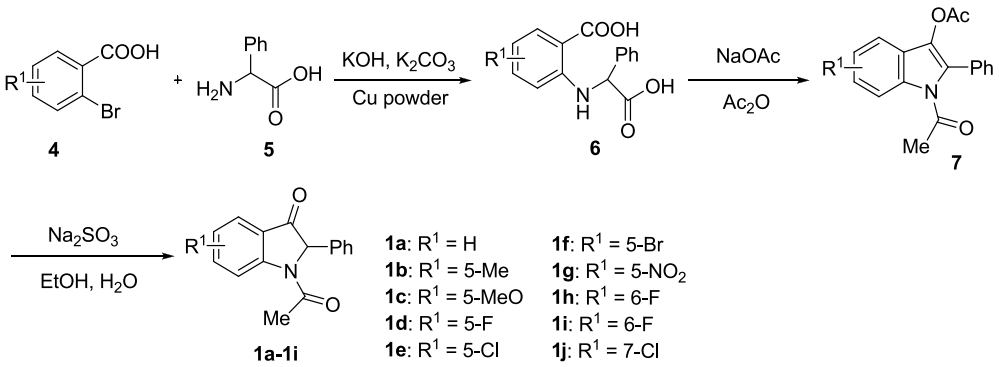
[a] *Institute of Medicinal Chemistry, School of Pharmaceutical Sciences, Sun Yat-sen University, Guangzhou 510006, People's Republic of China*

E-mail: *wengj2@mail.sysu.edu.cn; lugui@mail.sysu.edu.cn*

Table of Contents

1 General procedure for the synthesis of 2-substituted indolin-3-ones

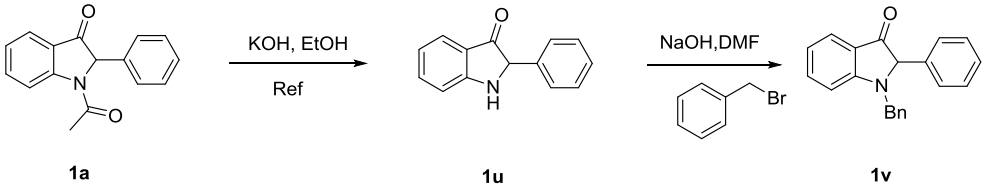
(a) General synthetic method of 2-phenyl indolin-3-ones[1]



To a solution of KOH (3.839 g, 68.4 mmol) and K_2CO_3 (4.149 g, 30.0 mmol) in H_2O (60 mL) was added glycine derivatives **5** (45 mmol, 1.5 equiv.) and **4** (30 mmol, 1 equiv.). Then Cu powder (10.8 mg) was added, and the mixture was refluxed for 12 h. After filtration, the filtrate was acidified with aqueous HCl (1 N, 120 mL), the formed precipitate was collected and dried over P_2O_5 in a desiccator under reduced pressure to give **6**.

To a solution of **6** (25 mmol, 1 equiv.) in Ac_2O (75 mL) was added NaOAc (37.5 mmol, 1.5 equiv.). The mixture was refluxed for 5 h, then cooled to 60 ^oC and concentrated under reduced pressure to remove Ac_2O. The residue was extracted with EtOAc (20 mL×4), the combined extract was washed with brine (20 mL) and dried over $MgSO_4$. After filtration, the filtrate was concentrated, the residue was dissolved in EtOH (60 mL), then a solution of Na_2SO_3 (37.5 mmol, 1.5 equiv.) in H_2O (20 mL) was added. The mixture was refluxed for 2 h, then the solvent was removed and H_2O (30 mL) was added. The mixture was extracted with EtOAc (40 mL×4), the combined extract was washed with brine (50 mL) and dried over $MgSO_4$. The organic solvent was evaporated, the residue was purified by flash column chromatography on silica gel to afford **1a**.

Substrates **1b-1j** were synthesized according to the above procedure.



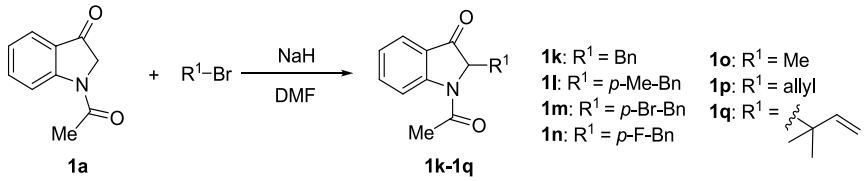
1a (5 mmol) and KOH (25 mmol) were added in EtOH (20 mL), the mixture was refluxed for 1 h， then cooled to rt and concentrated under reduced pressure to remove EtOH. The residue was extracted with EtOAc (10 mL×3), the combined extract was washed with brine (10 mL) and dried over Na_2SO_4.The organic solvent was evaporated, the residue was purified by flash column chromatography on silica gel to afford **1u.**

1u (3 mol) and NaOH (4.5 mmol) were dissolved in DMF (5 mL),and then benzyl bromide was slowly added. The solution was kept at room temperature for 15 h, then diluted with CH_2Cl_2 and purified by flash column chromatography on silica gel to afford **1v**.

Compound 1v: 94% yield; white solid; ^1H NMR (400 MHz, Chloroform-d) δ 7.30 (m, 2H),

7.25–7.14 (m, 8H), 7.09 (m, 2H), 6.91 (t, J = 7.5 Hz, 1H), 6.65 (d, J = 7.8 Hz, 1H), 4.89 (d, J = 15.7 Hz, 1H), 4.67 (d, J = 15.7 Hz, 1H), 4.37 (s, 1H); ^{13}C NMR (101 MHz, Chloroform-d) δ 177.8, 142.6, 140.4, 135.5, 132.1, 129.6, 128.9, 128.9, 128.6, 128.6, 128.2, 127.8, 127.3, 127.3, 125.5, 125.5, 125.0, 123.5, 109.7, 78.1, 44.0. ESI-HRMS: *m/z* $[M+H]^+$ calcd. for $C_{26}H_{32}N_3O_6$: 300.1383, found: 300.1392

(b) General synthetic method of 2-benzyindolin-3-ones



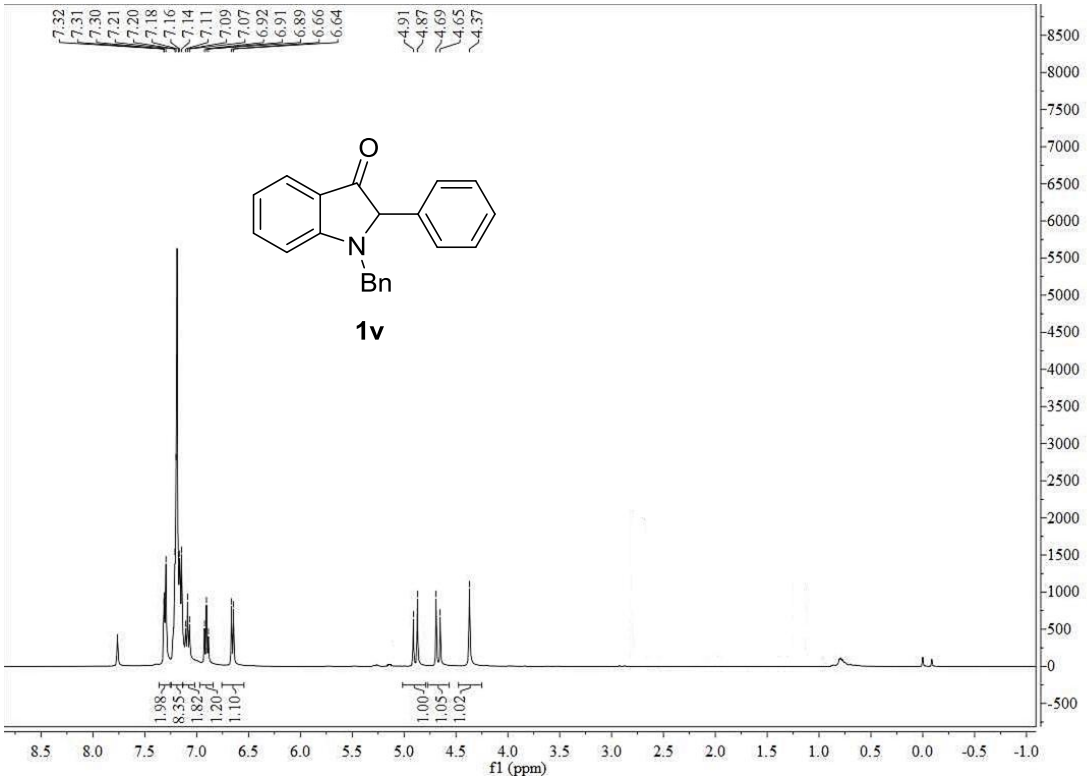
1a (350 mg, 2 mmol, 1 equiv.) and DMF (5 mL) were added to a round-bottom flask. Then sodium hydride (1.2 equiv. in 5 mL DMF) was added slowly using a syringe at 0 ℃. After the reaction mixture was stirred at 0 ℃ for 30 min, alkyl bromide (2.2 mmol, 1.1 equiv.) was slowly added. The solution was kept at room temperature for 20 h, then diluted with CH_2Cl_2 and purified by flash column chromatography on silica gel to afford **1n**.

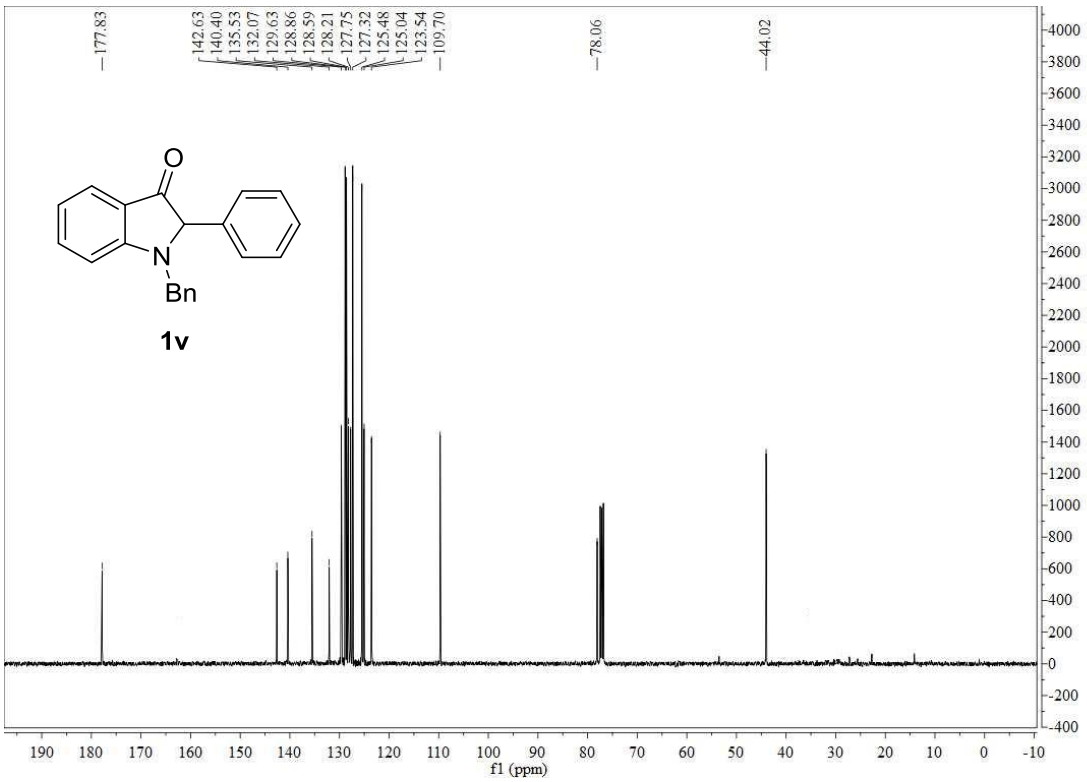
Substrates **1o**-**1t** were synthesized according to the above procedure.

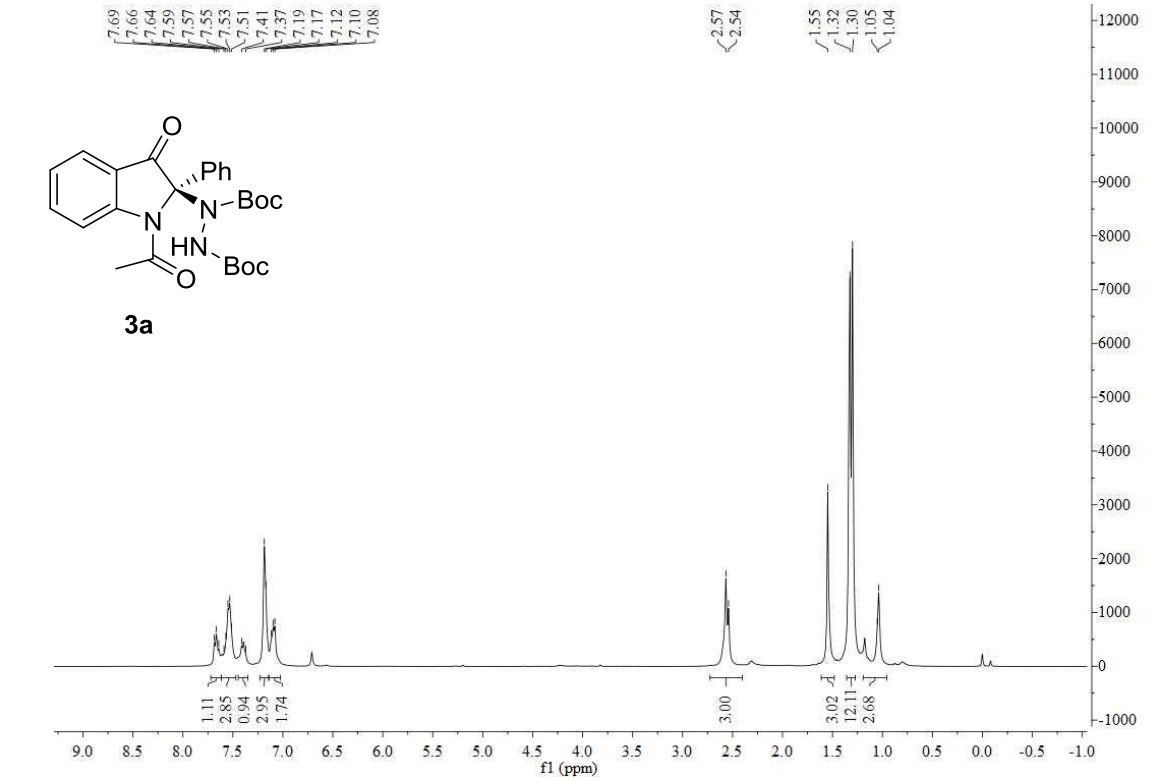
2 References

[1] a) Rodríguez-Domínguez, J. C.; Balbuzano-Deus, A.; López-López, M. A.; Kirsch, G. *J. Heterocyclic Chem.* **2007**, *44*, 273. b) Matsumoto, S.; Samata, D.; Akazome, M.; Ogura, K. *Tetrahedron Lett*. **2009**, *50*, 111.

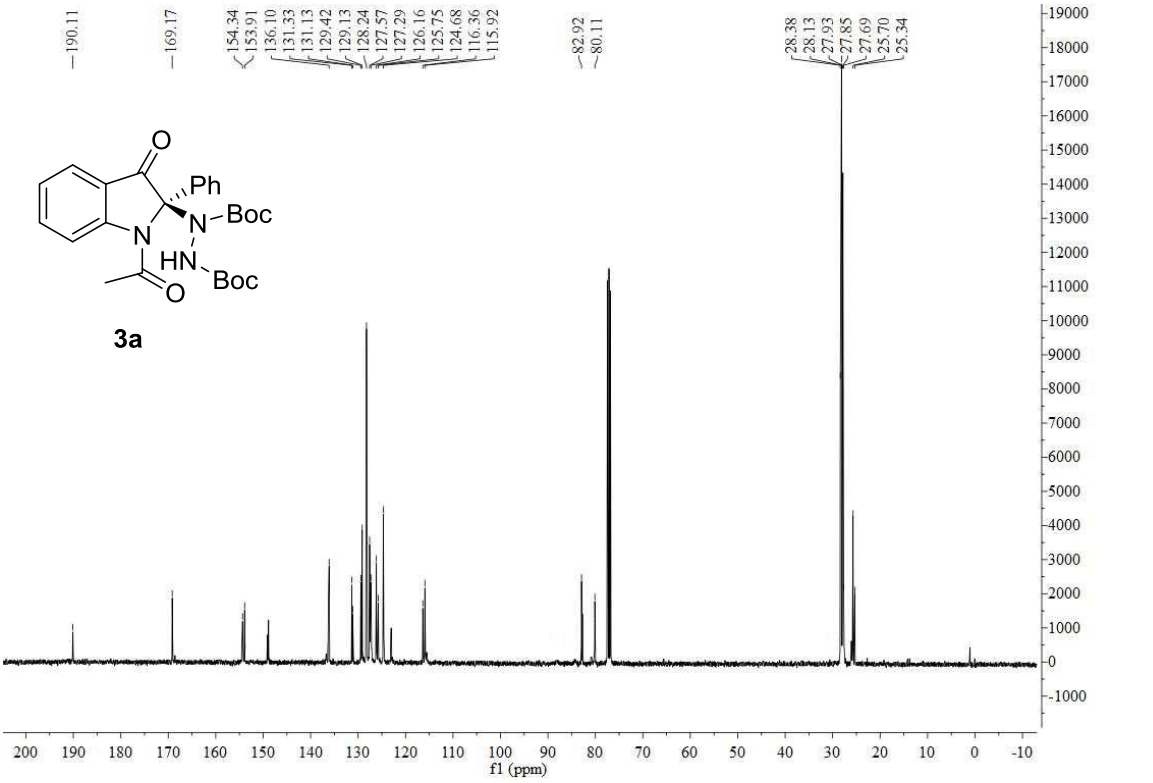
3 Copies of ^{1}H and ^{13}C NMR spectra of compounds 1s and 3a-3t



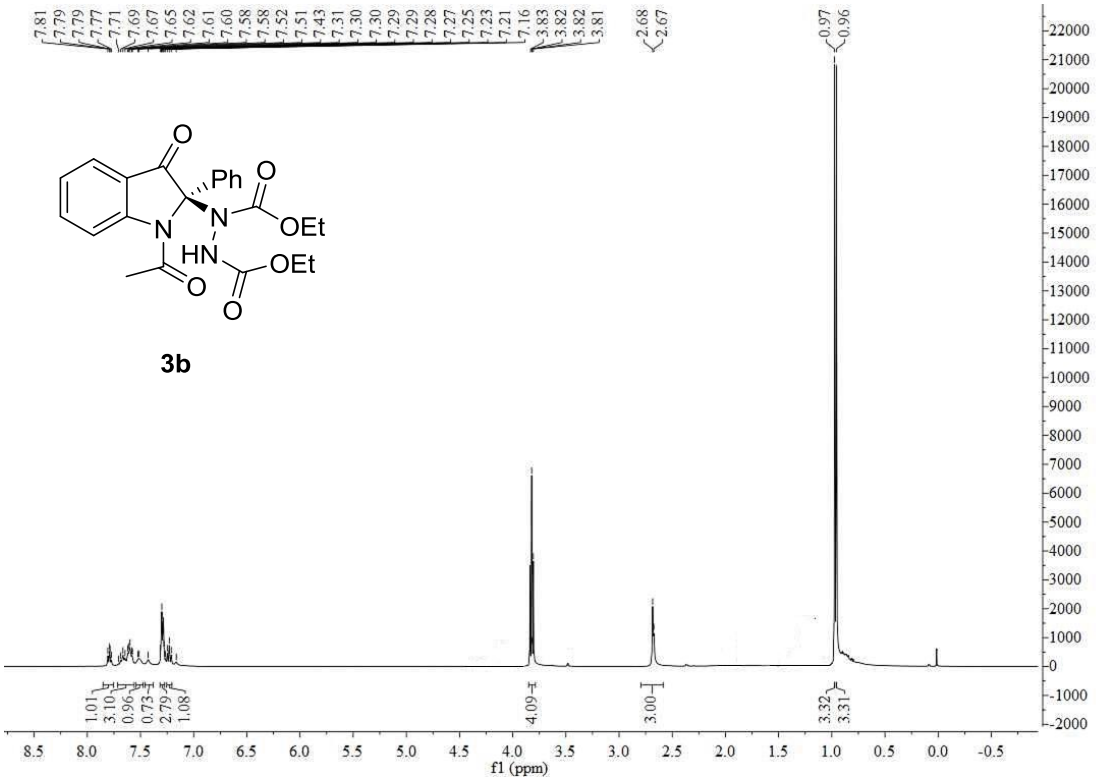



7.69
7.66
7.64
7.59
7.57
7.55
7.53
7.51
7.41
7.37
7.19
7.17
7.12
7.10
7.08
2.57
2.54
1.55
1.32
1.30
1.05
1.04
O
Ph
N
Boc
N
HN
Boc
O
1.11
2.85
0.94
2.95
1.74
3.00
3.02
12.11
2.68
f1 (ppm)

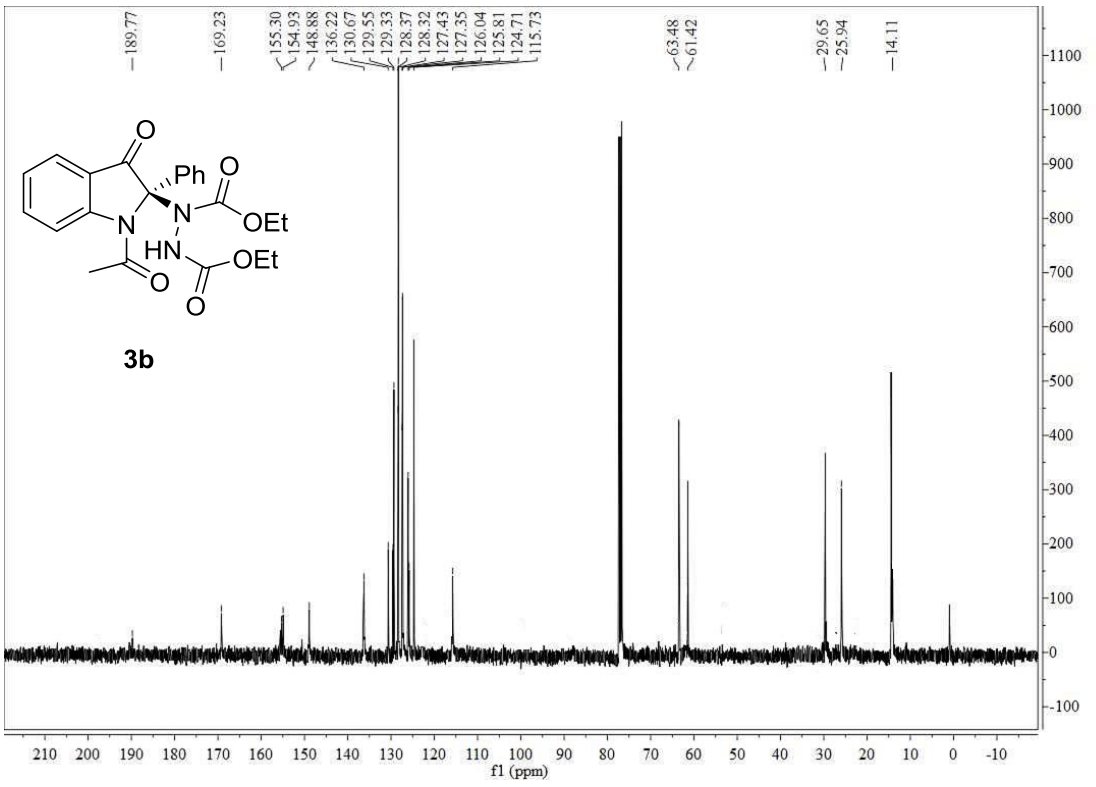
3a


190.11
169.17
154.34
153.91
136.10
131.33
131.13
129.42
129.13
128.24
127.57
127.29
126.16
125.75
124.68
116.36
115.92
82.92
80.11
28.38
28.13
27.93
27.85
27.69
25.70
25.34
O
Ph
N
Boc
N
HN
Boc
O
f1 (ppm)

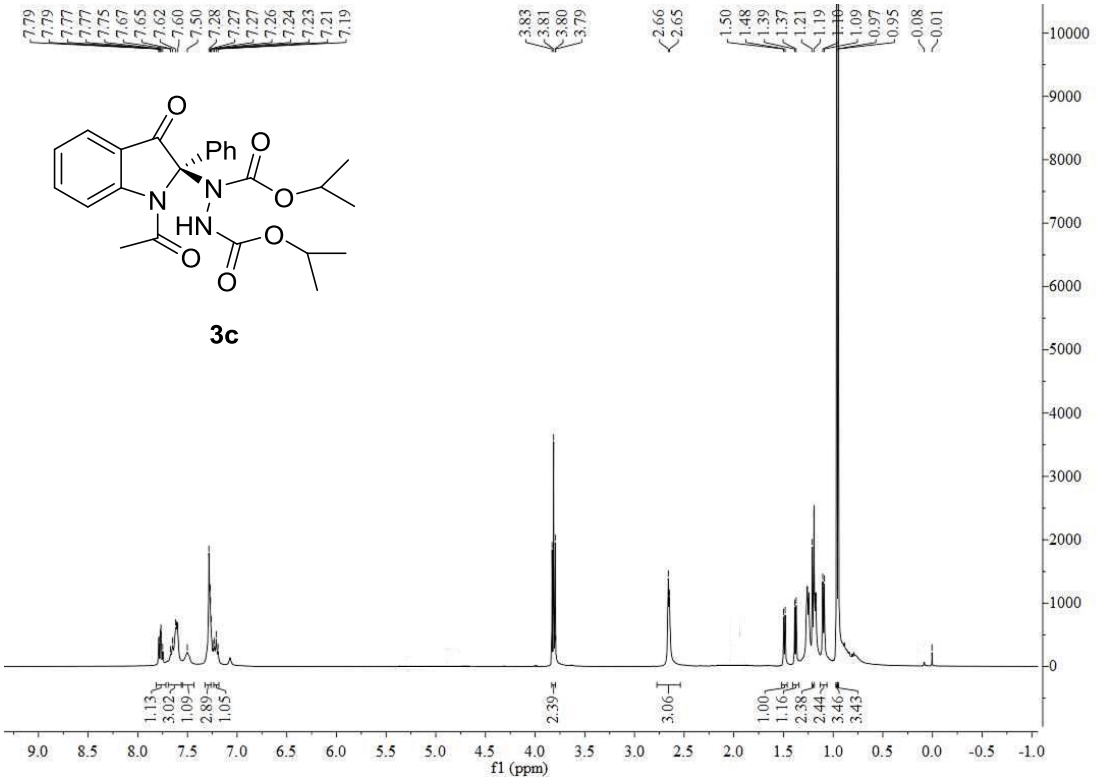
3a


7.81
7.79
7.79
7.77
7.71
7.69
7.67
7.65
7.62
7.61
7.60
7.58
7.58
7.52
7.51
7.43
7.31
7.30
7.30
7.29
7.29
7.28
7.27
7.25
7.23
7.21
7.16
3.83
3.82
3.82
3.81
2.68
2.67
0.97
0.96
O
Ph
O
N
OEt
N
HN
OEt
O
O
1.01
3.10
0.96
0.73
2.79
1.08
4.09
3.00
3.32
3.31
f1 (ppm)

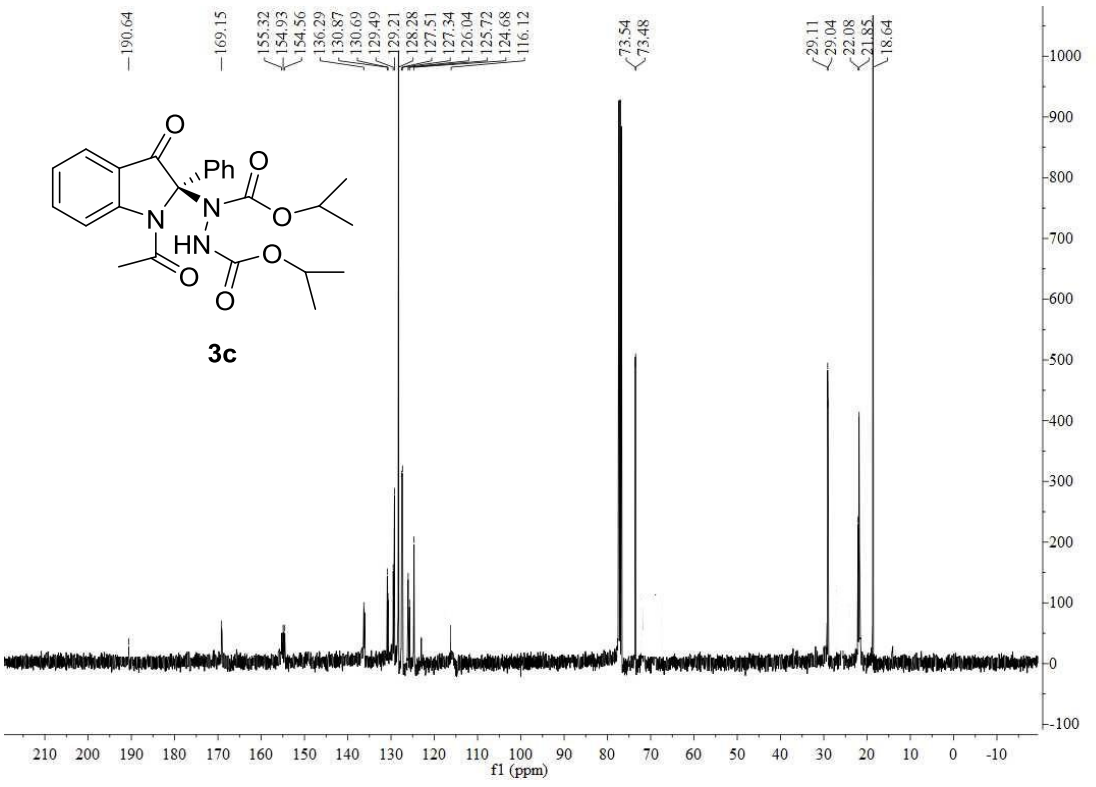
3b


189.77
169.23
155.30
154.93
148.88
136.22
130.67
129.55
129.33
128.37
128.32
127.43
127.35
126.04
125.81
124.71
115.73
63.48
61.42
29.65
25.94
14.11
O
Ph
O
N
OEt
N
HN
OEt
O
O
f1 (ppm)

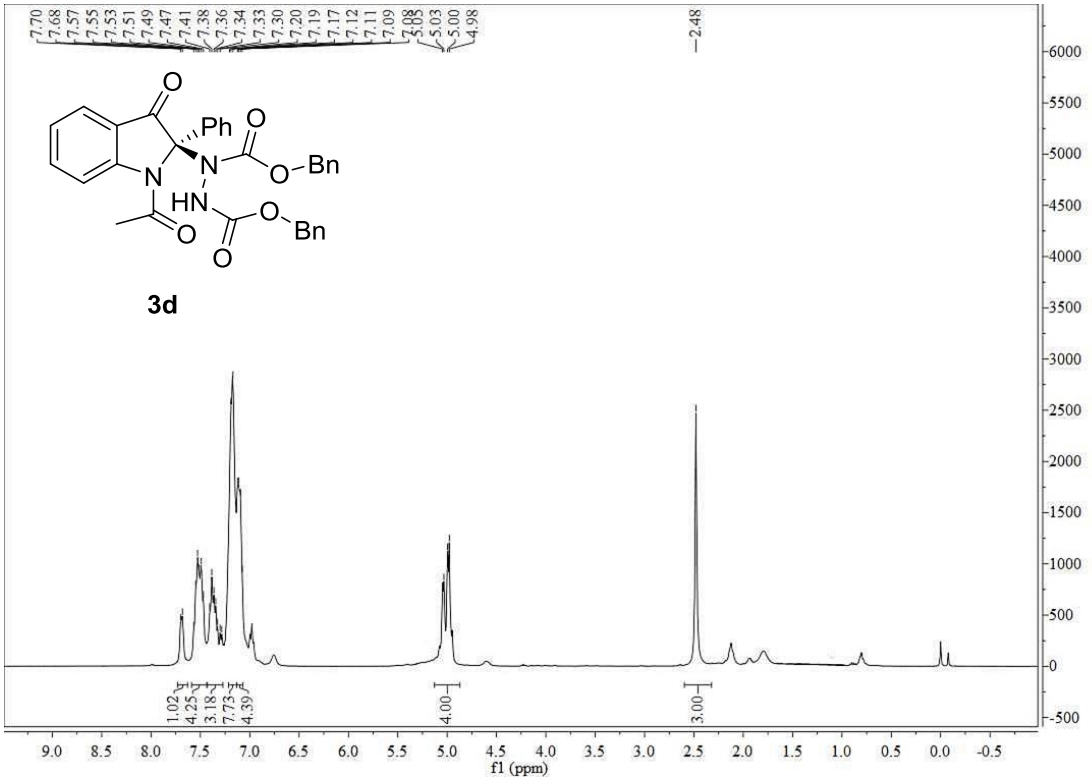
3b

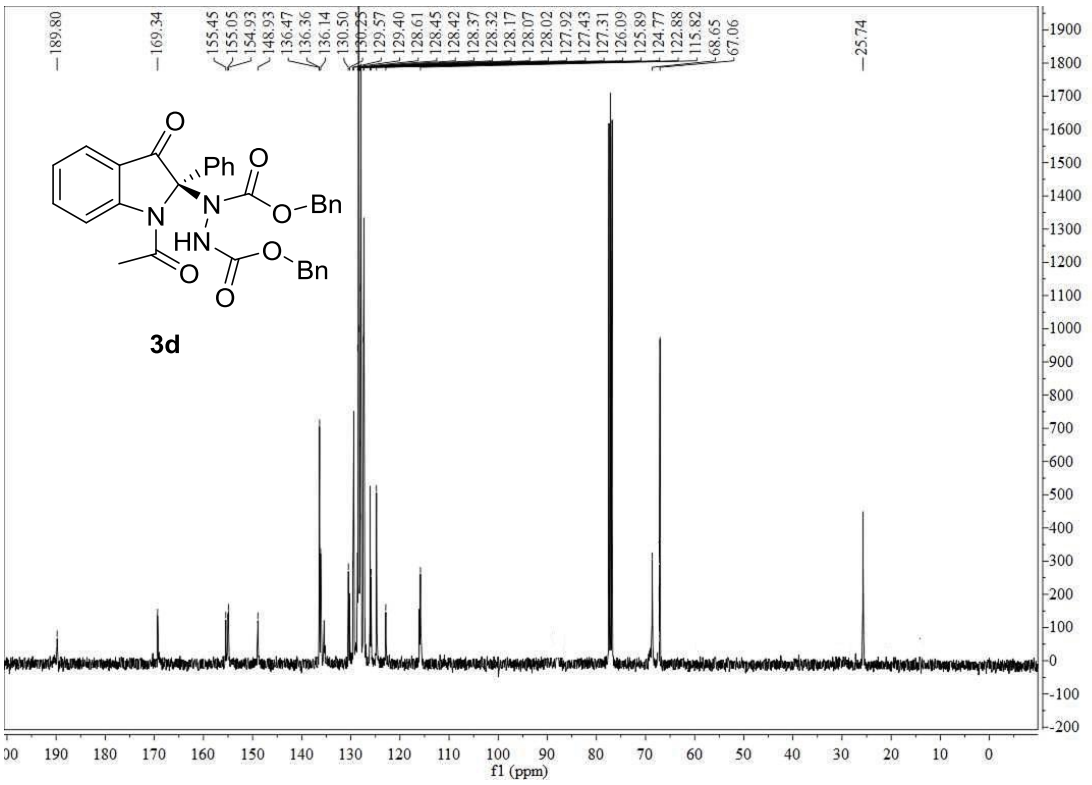

7.79
7.79
7.77
7.77
7.75
7.67
7.65
7.62
7.60
7.50
7.28
7.27
7.27
7.26
7.24
7.23
7.21
7.19
3.83
3.81
3.80
3.79
2.66
2.65
1.50
1.48
1.39
1.37
1.21
1.19
1.09
0.97
0.95
0.08
0.01
Ph
O
N
HN
1.13
3.02
1.09
2.89
1.05
2.39
3.06
1.00
1.16
2.38
2.44
3.46
3.43
f1 (ppm)

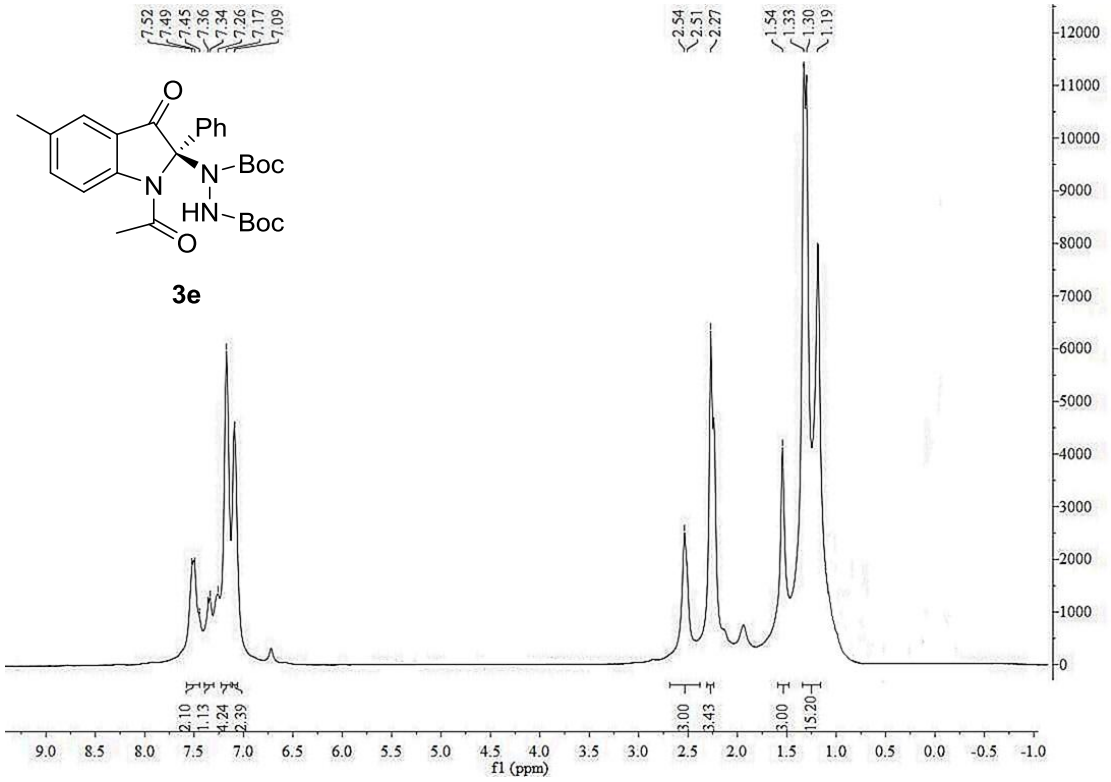
3c

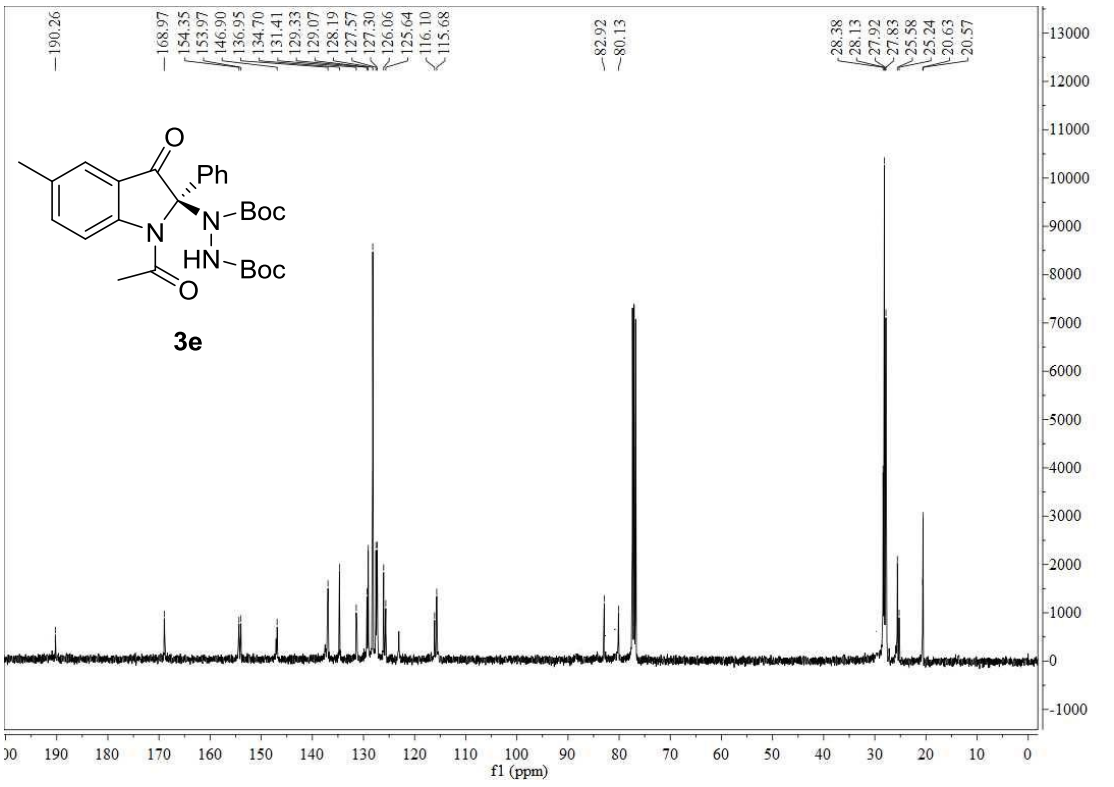

190.64
169.15
155.32
154.93
154.56
136.29
130.87
130.69
129.49
129.21
128.28
127.51
127.34
126.04
125.72
124.68
116.12
73.54
73.48
29.11
29.04
22.08
21.85
18.64
Ph
O
N
HN
f1 (ppm)

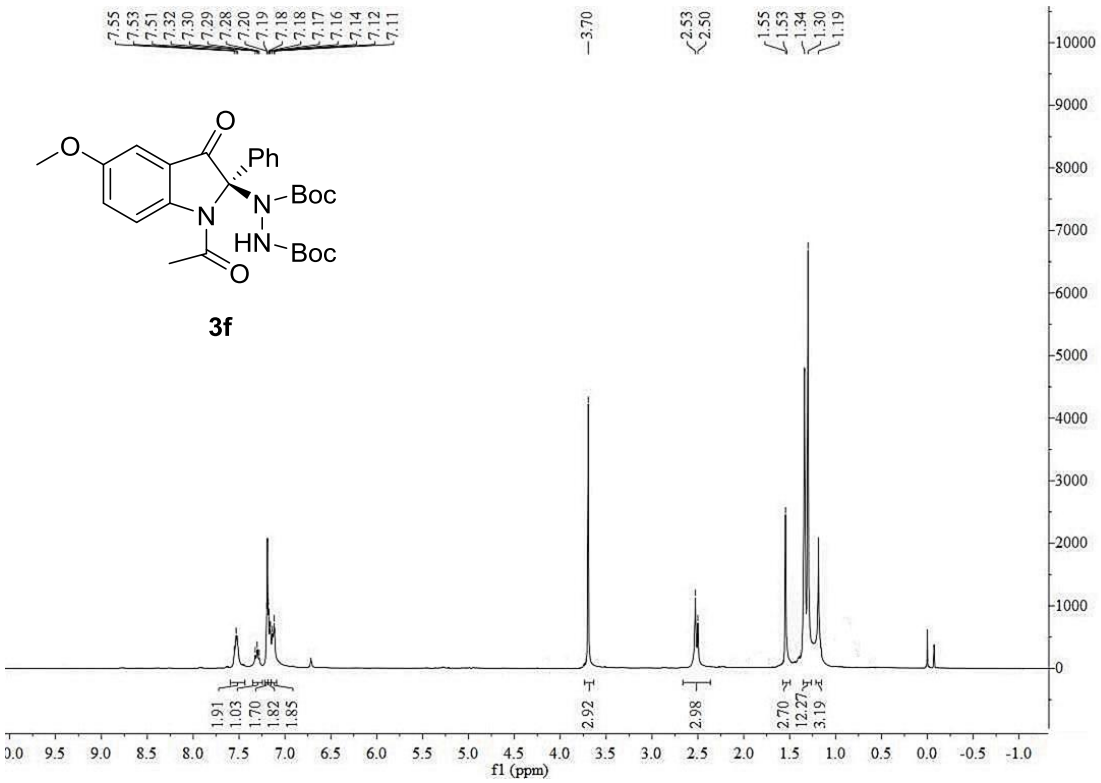
3c

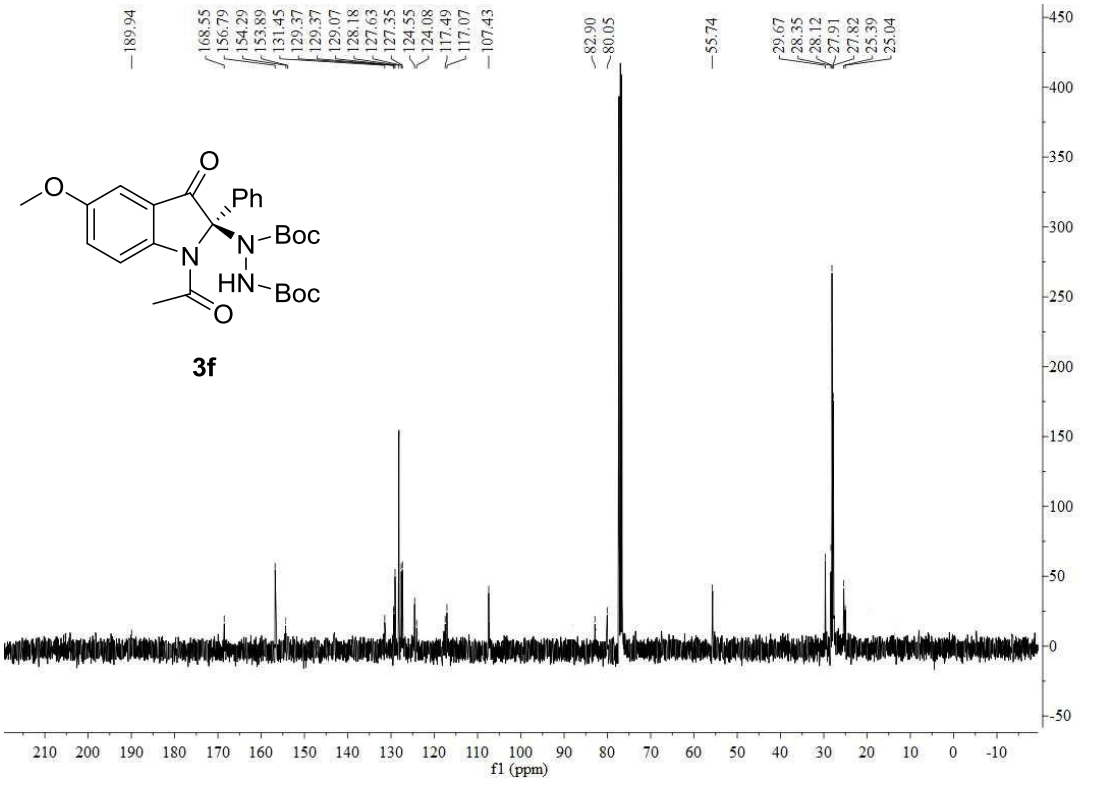

7.70
7.68
7.57
7.55
7.53
7.51
7.49
7.47
7.41
7.38
7.36
7.34
7.33
7.30
7.20
7.19
7.17
7.12
7.11
7.09
5.03
5.00
4.98
2.48
Ph
O
N
N
HN
O
O
Bn
O
O
Bn
O
3d
1.02
4.25
3.18
7.73
4.39
4.00
3.00
f1 (ppm)

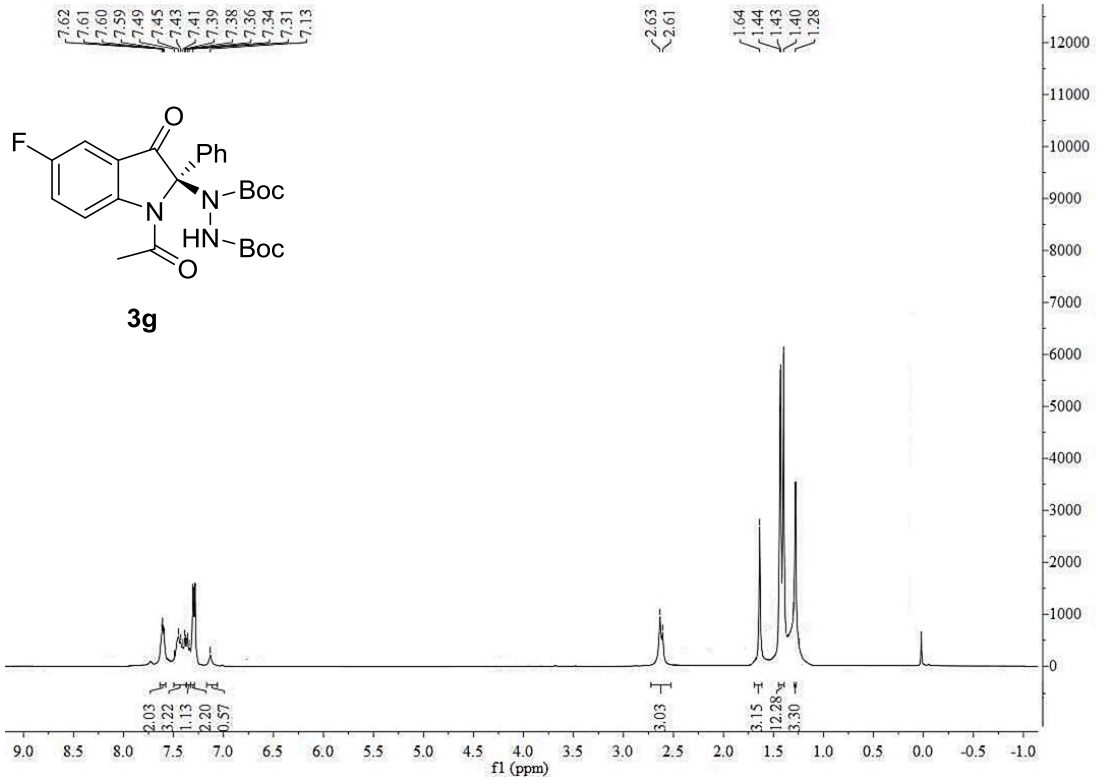

189.80
169.34
155.45
155.05
154.93
148.93
136.47
136.36
136.14
130.50
130.25
129.57
129.40
128.61
128.45
128.42
128.37
128.32
128.17
128.07
128.02
127.92
127.43
127.31
126.09
125.89
124.77
122.88
115.82
68.65
67.06
25.74
Ph
O
N
N
HN
O
O
Bn
O
O
Bn
O
3d
f1 (ppm)

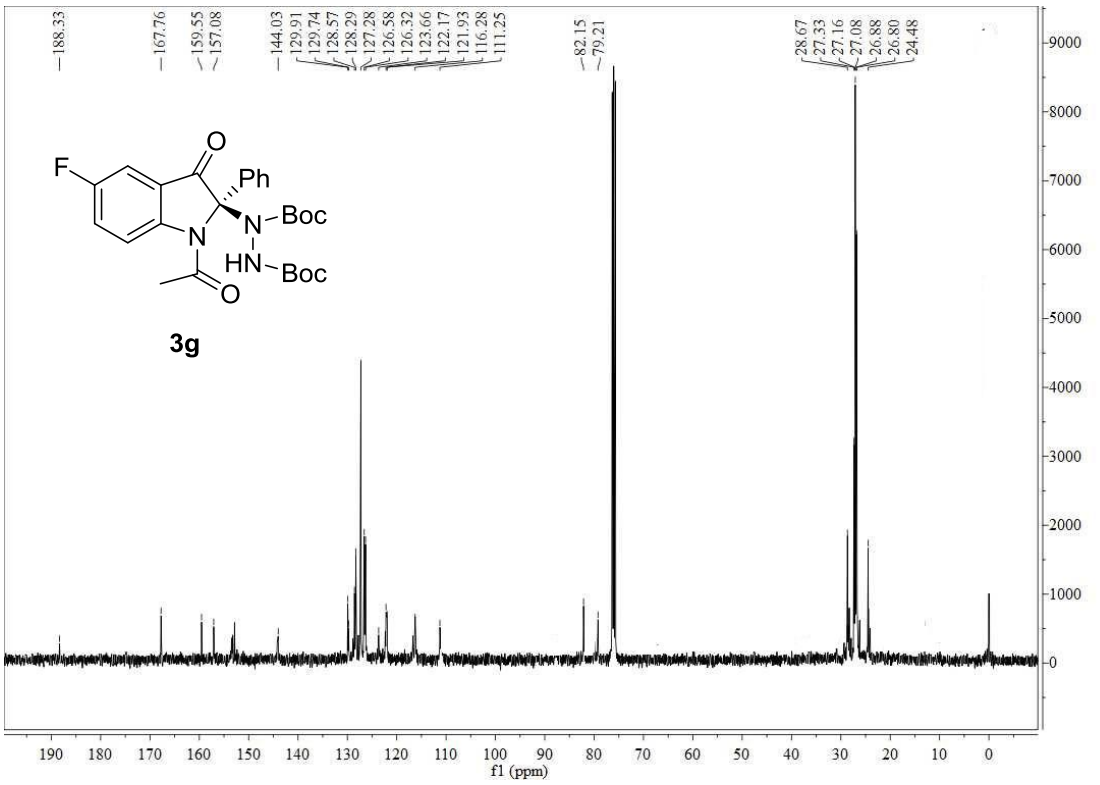

7.52
7.49
7.45
7.36
7.34
7.26
7.17
7.09
2.54
2.51
2.27
1.54
1.33
1.30
1.19
O
Ph
N
Boc
N
HN
Boc
O
3e
2.10
1.13
4.24
2.39
3.00
3.43
3.00
15.20
f1 (ppm)

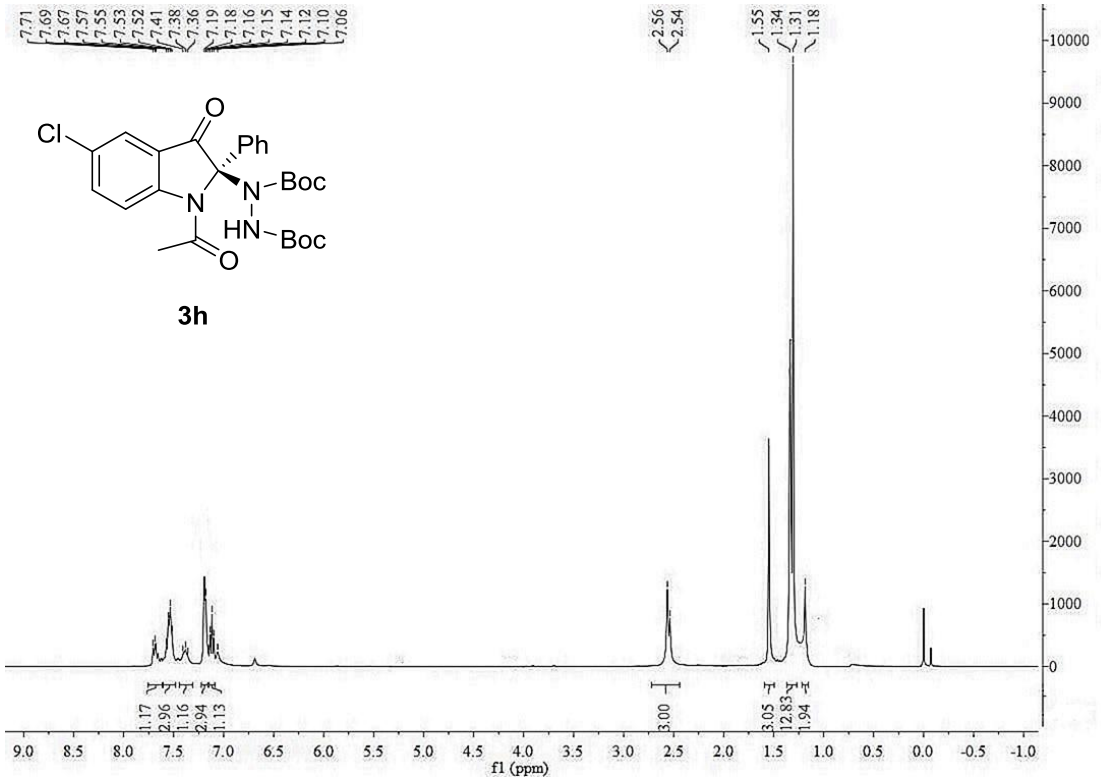

190.26
168.97
154.35
153.97
146.90
136.95
134.70
131.41
129.33
129.07
128.19
127.57
127.30
126.06
125.64
116.10
115.68
82.92
80.13
28.38
28.13
27.92
27.83
25.58
25.24
20.63
20.57
O
Ph
N
Boc
N
HN
Boc
O
3e
f1 (ppm)


7.55
7.53
7.51
7.32
7.30
7.29
7.28
7.20
7.19
7.18
7.18
7.17
7.16
7.14
7.12
7.11
3.70
2.53
2.50
1.55
1.53
1.34
1.30
1.19
O
Ph
N
Boc
N
HN
Boc
O
O
3f
1.91
1.03
1.70
1.82
1.85
2.92
2.98
2.70
12.27
3.19
f1 (ppm)

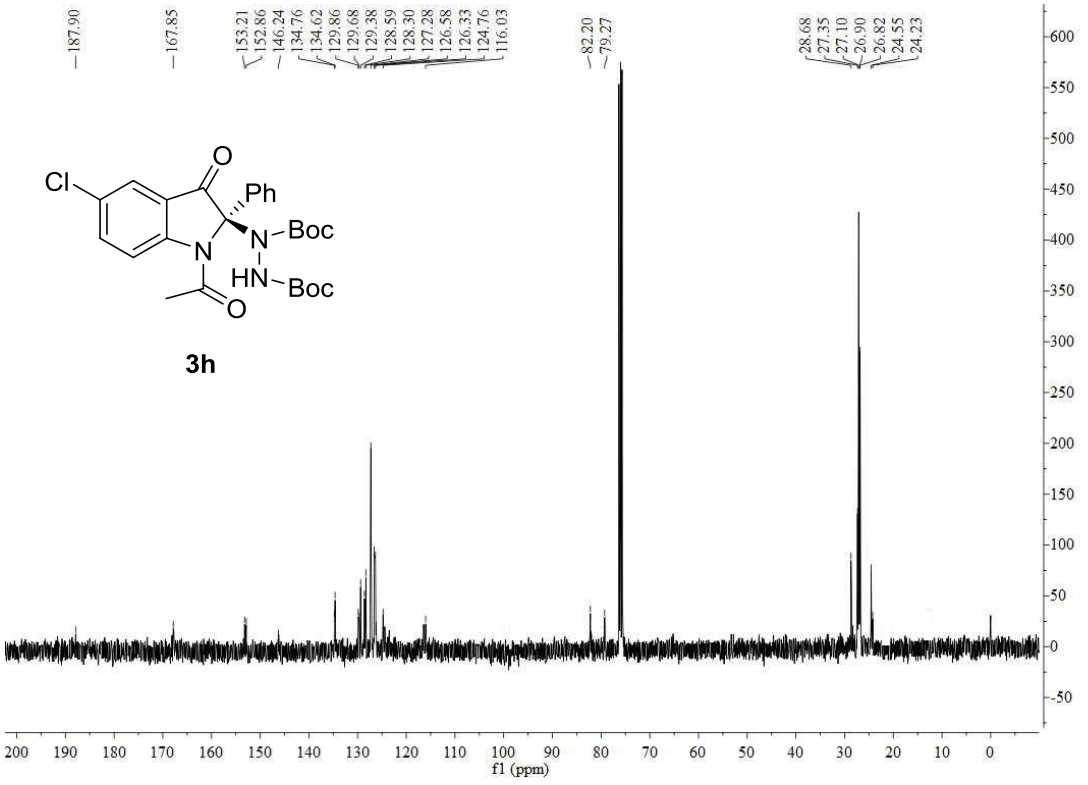

189.94
168.55
156.79
154.29
153.89
131.45
129.37
129.37
129.07
128.18
127.63
127.35
124.55
124.08
117.49
117.07
107.43
82.90
80.05
55.74
29.67
28.35
28.12
27.91
27.82
25.39
25.04
O
Ph
N
Boc
N
HN
Boc
O
O
3f
f1 (ppm)


7.62
7.61
7.60
7.59
7.49
7.45
7.43
7.41
7.39
7.38
7.36
7.34
7.31
7.13
2.63
2.61
1.64
1.44
1.43
1.40
1.28
F
O
Ph
N
Boc
N
HN
Boc
O
3g
2.03
3.22
1.13
2.20
0.57
3.03
3.15
12.28
3.30
f1 (ppm)

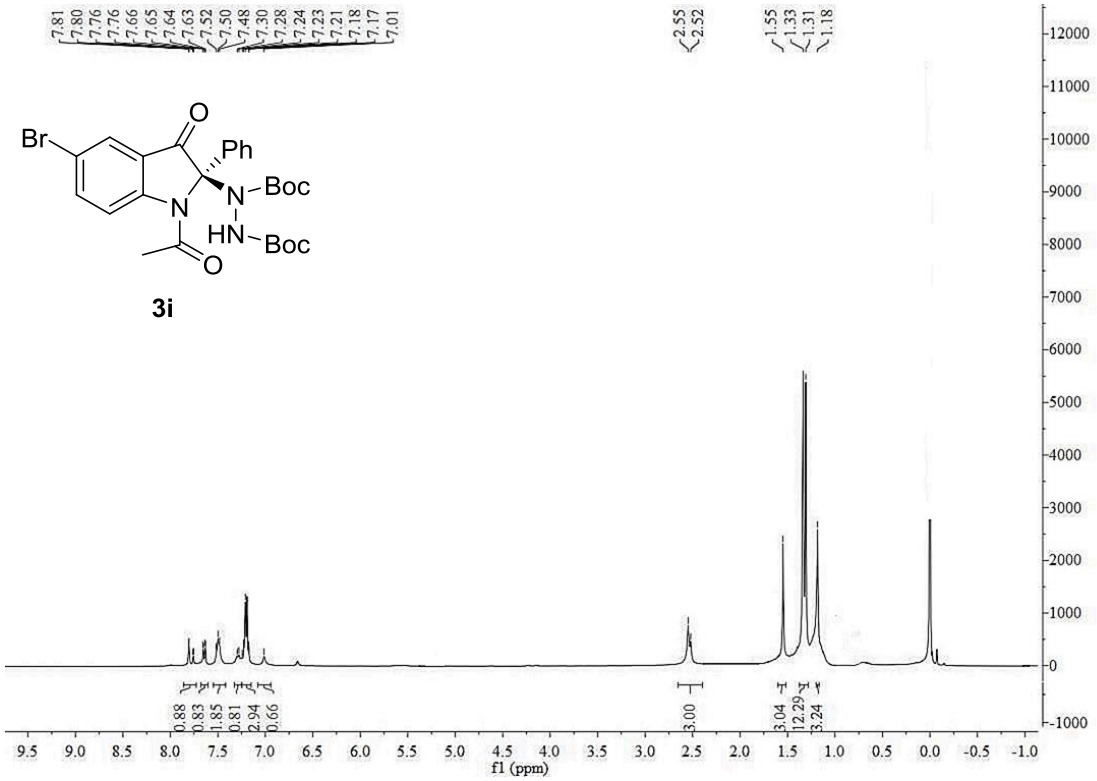

188.33
167.76
159.55
157.08
144.03
129.91
129.74
128.57
128.29
127.28
126.58
126.32
123.66
122.17
121.93
116.28
111.25
82.15
79.21
28.67
27.33
27.16
27.08
26.88
26.80
24.48
F
O
Ph
N
Boc
N
HN
Boc
O
3g
f1 (ppm)

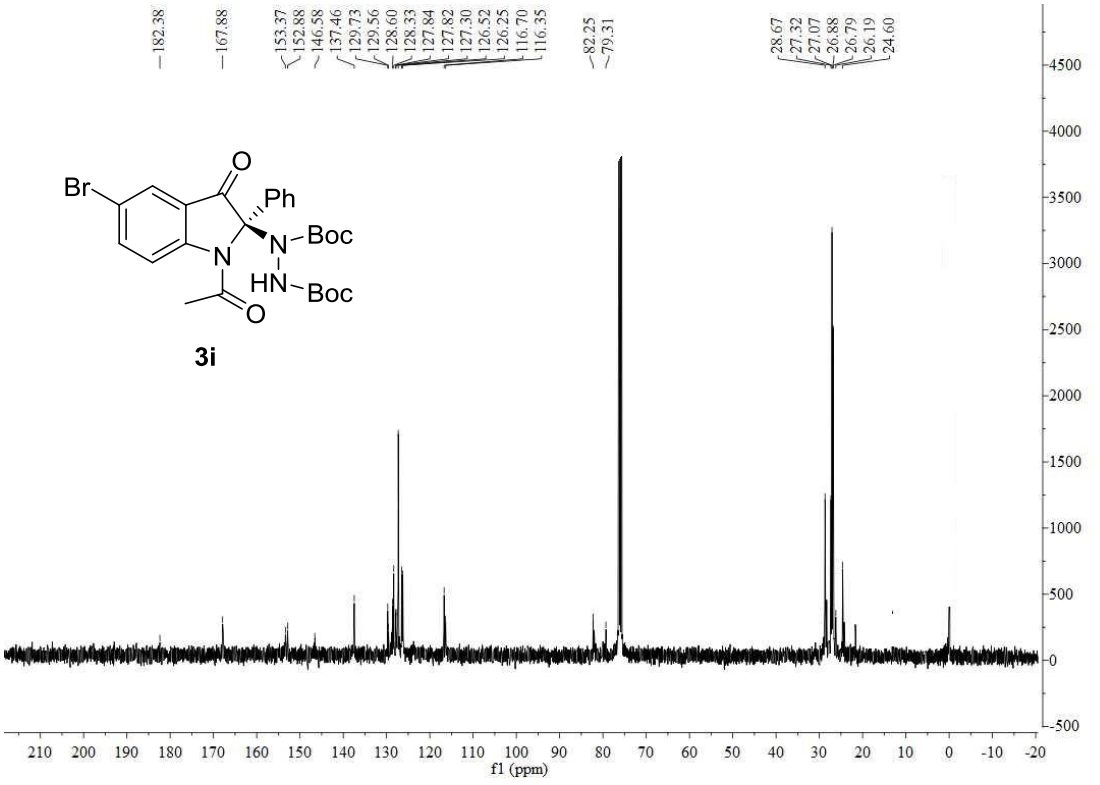


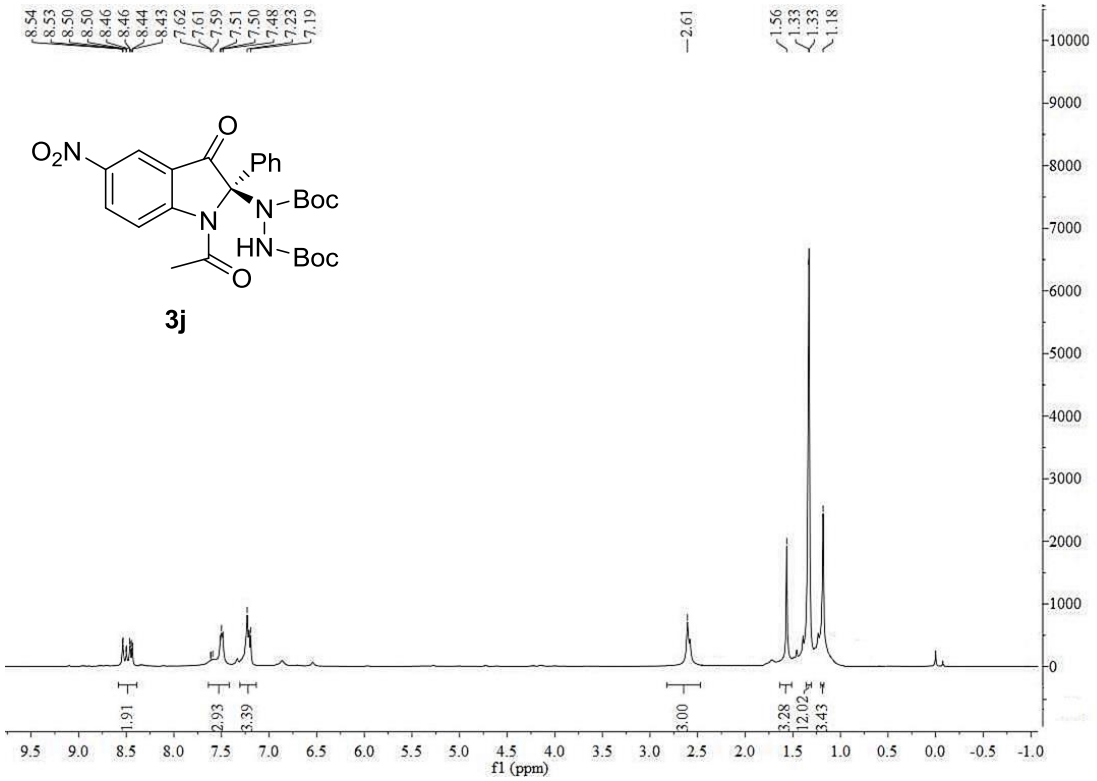
3h



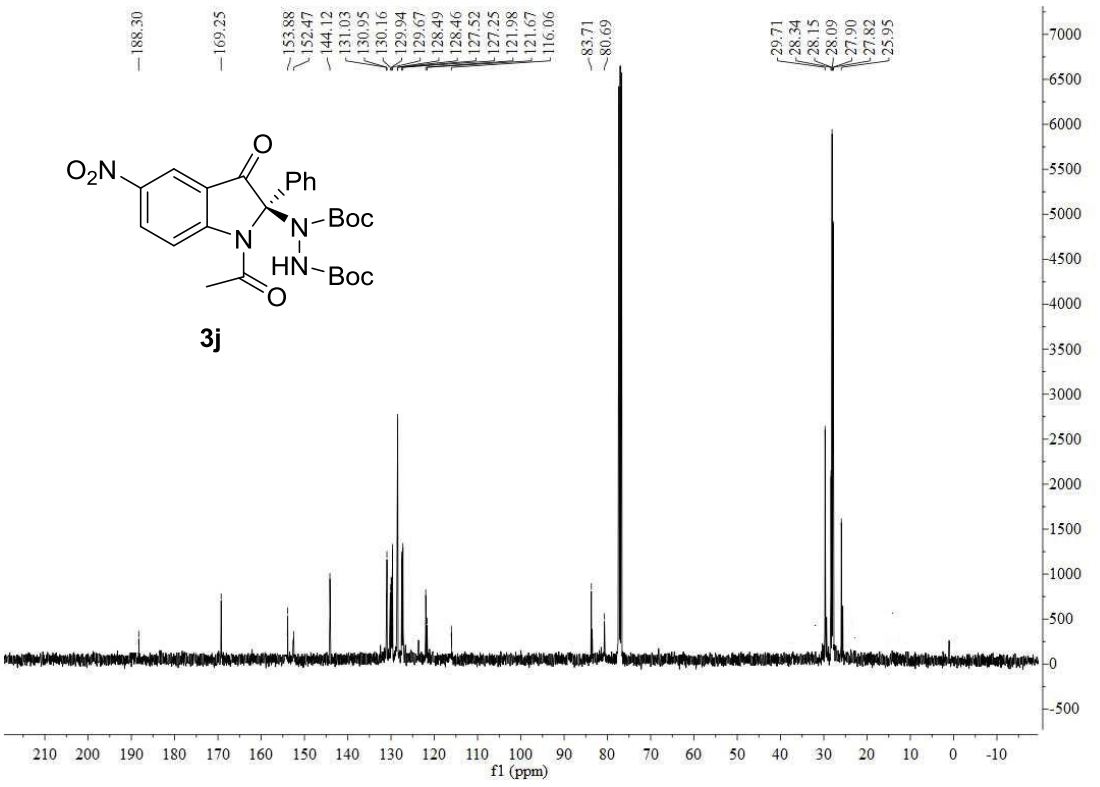
3h


7.81
7.80
7.76
7.76
7.66
7.65
7.64
7.63
7.52
7.50
7.48
7.30
7.28
7.24
7.23
7.21
7.18
7.17
7.01
2.55
2.52
1.55
1.33
1.31
1.18
Br
O
Ph
N
Boc
N
HN
Boc
O
3i
0.88
0.83
1.85
0.81
2.94
0.66
3.00
3.04
12.29
3.24
f1 (ppm)

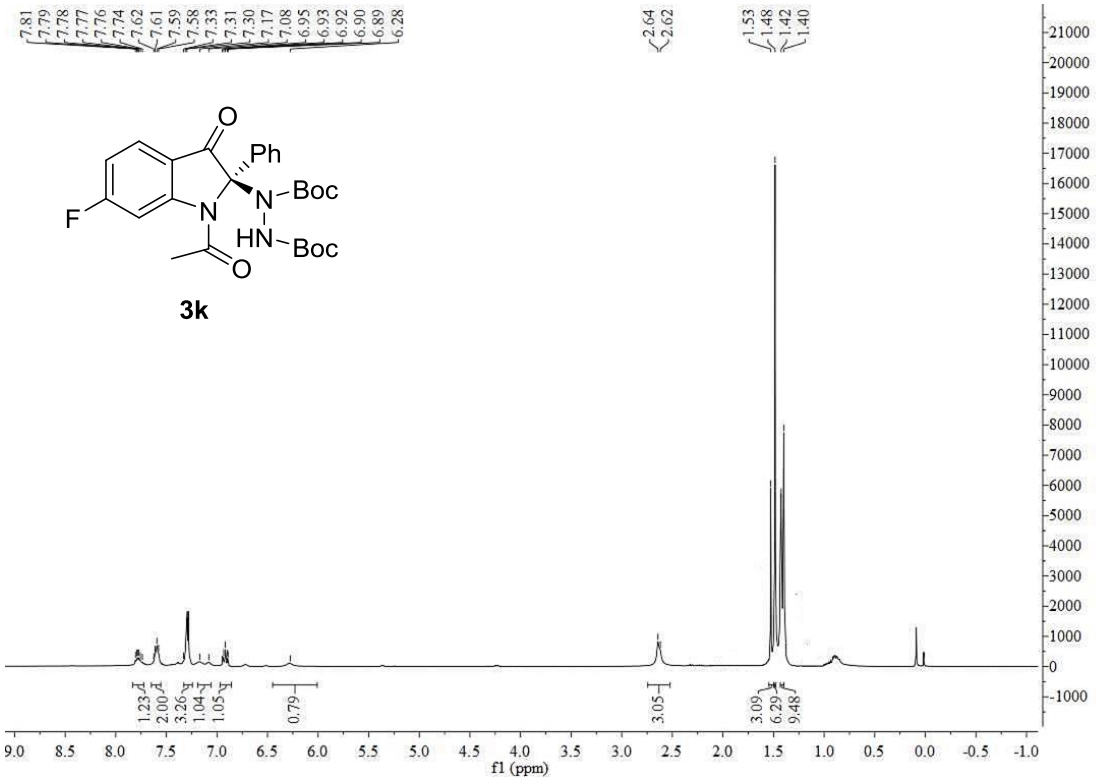

182.38
167.88
153.37
152.88
146.58
137.46
129.73
129.56
128.60
128.33
127.84
127.82
127.30
126.52
126.25
116.70
116.35
82.25
79.31
28.67
27.32
27.07
26.88
26.79
26.19
24.60
Br
O
Ph
N
Boc
N
HN
Boc
O
3i
f1 (ppm)


8.54
8.53
8.50
8.50
8.46
8.46
8.44
8.43
7.62
7.61
7.59
7.51
7.50
7.48
7.23
7.19
2.61
1.56
1.33
1.33
1.18
O2N
O
Ph
N
N
Boc
HN
Boc
O
1.91
2.93
3.39
3.00
3.28
12.02
3.43
f1 (ppm)

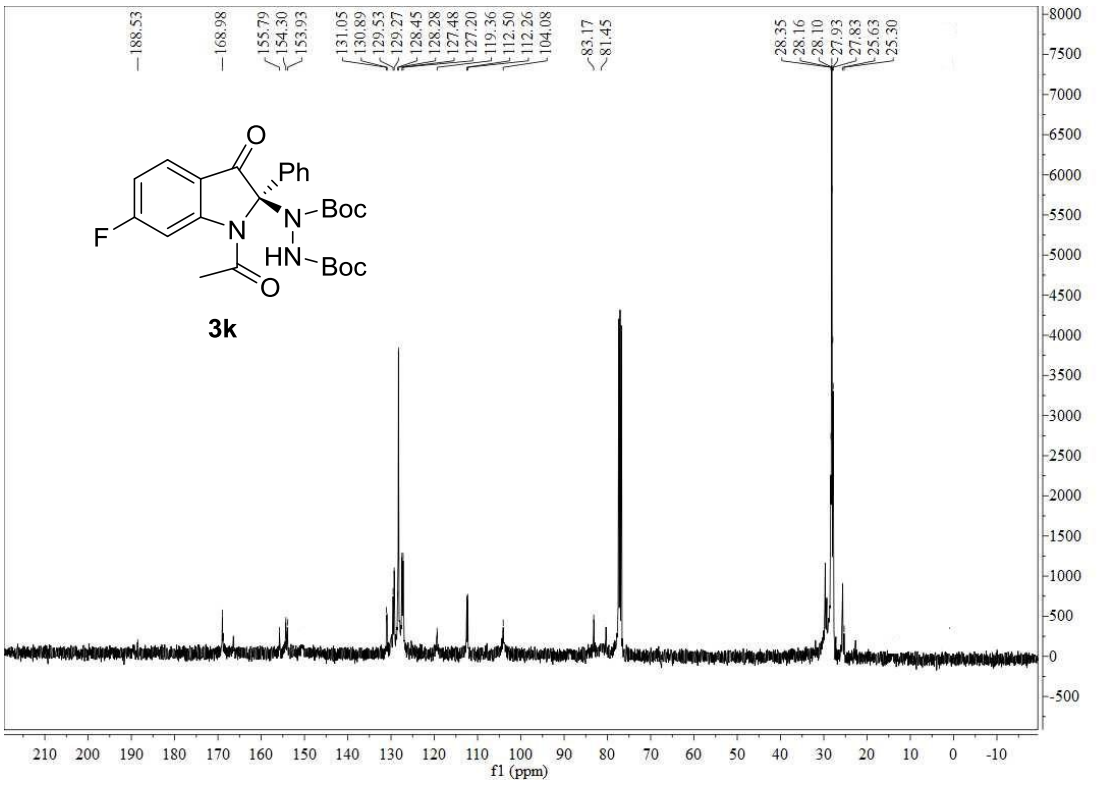
3j


188.30
169.25
153.88
152.47
144.12
131.03
130.95
130.16
129.94
129.67
128.49
128.46
127.52
127.25
121.98
121.67
116.06
83.71
80.69
29.71
28.34
28.15
28.09
27.90
27.82
25.95
O2N
O
Ph
N
N
Boc
HN
Boc
O
f1 (ppm)

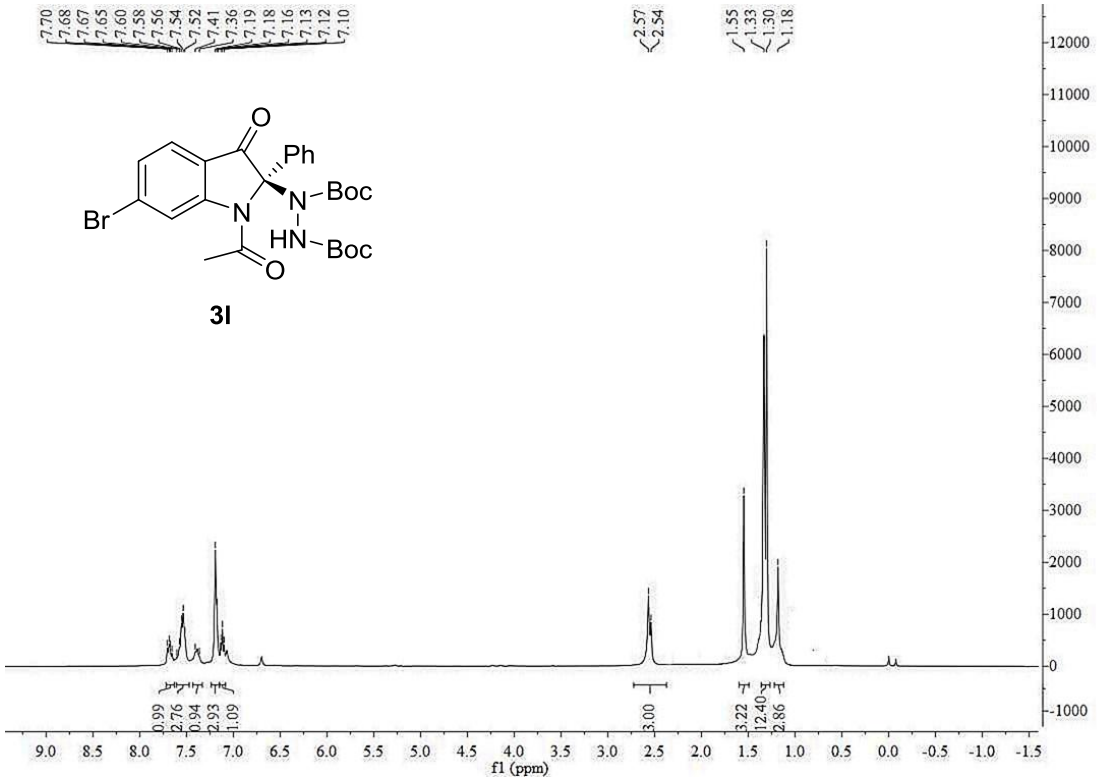
3j


7.81
7.79
7.78
7.77
7.76
7.74
7.62
7.61
7.59
7.58
7.33
7.31
7.30
7.17
7.08
6.95
6.93
6.92
6.90
6.89
6.28
2.64
2.62
1.53
1.48
1.42
1.40
O
Ph
F
N
N-Boc
HN-Boc
O
1.23
2.00
3.26
1.04
1.05
0.79
3.05
3.09
6.29
9.48
f1 (ppm)

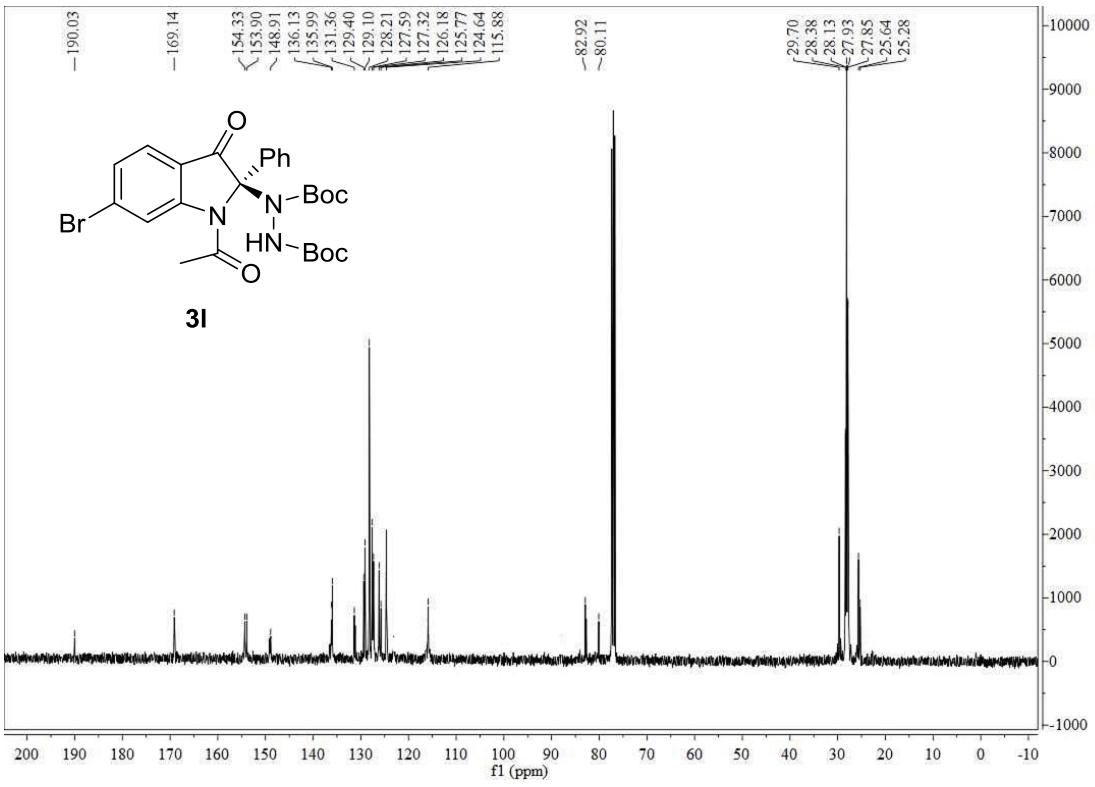
3k


188.53
168.98
155.79
154.30
153.93
131.05
130.89
129.53
129.27
128.45
128.28
127.48
127.20
119.36
112.50
112.26
104.08
83.17
81.45
28.35
28.16
28.10
27.93
27.83
25.63
25.30
O
Ph
F
N
N-Boc
HN-Boc
O
f1 (ppm)

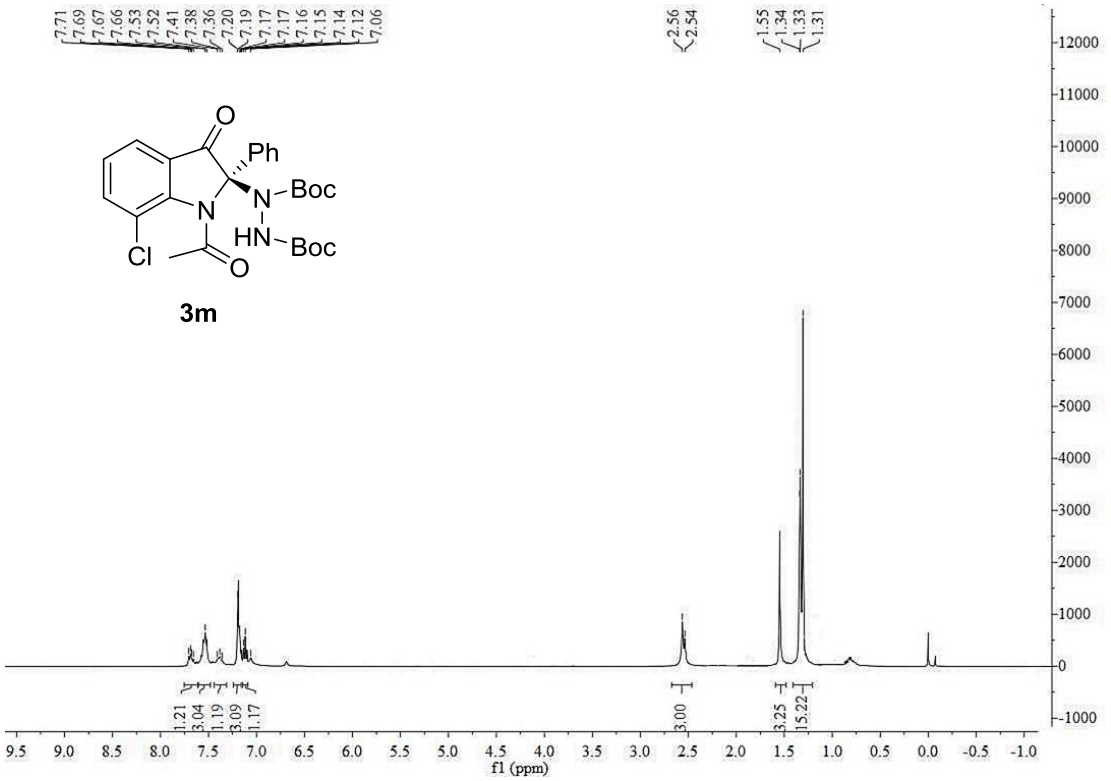
3k

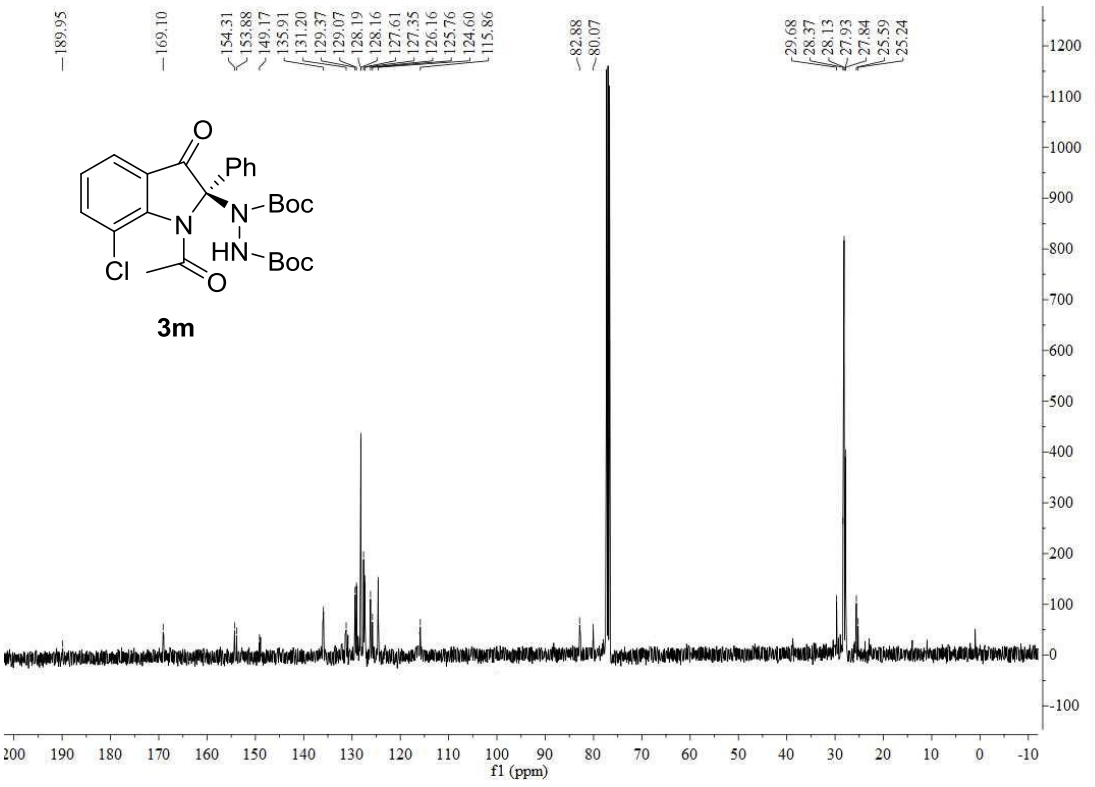

7.70
7.68
7.67
7.65
7.60
7.58
7.56
7.54
7.52
7.41
7.36
7.19
7.18
7.16
7.13
7.12
7.10
2.57
2.54
1.55
1.33
1.30
1.18
O
Ph
Boc
N
Br
N
HN
Boc
O
0.99
2.76
0.94
2.93
1.09
3.00
3.22
12.40
2.86
f1 (ppm)

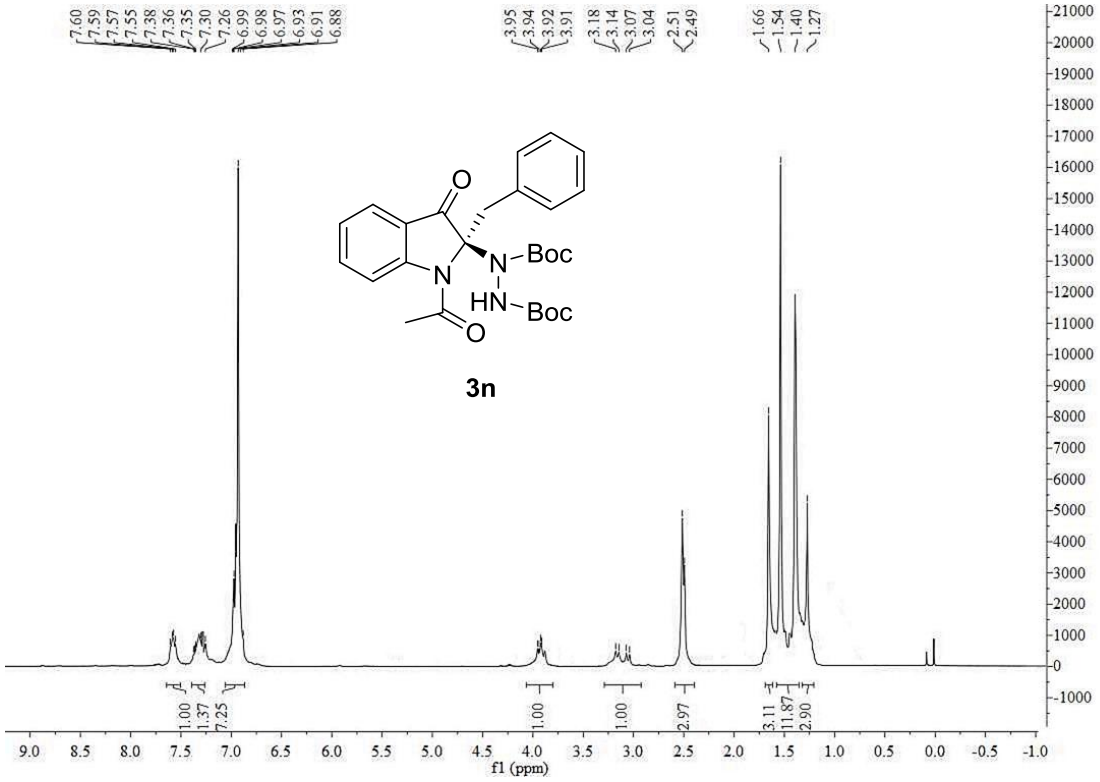
3l


190.03
169.14
154.33
153.90
148.91
136.13
135.99
131.36
129.40
129.10
128.21
127.59
127.32
126.18
125.77
124.64
115.88
82.92
80.11
29.70
28.38
28.13
27.93
27.85
25.64
25.28
O
Ph
Boc
N
Br
N
HN
Boc
O
f1 (ppm)

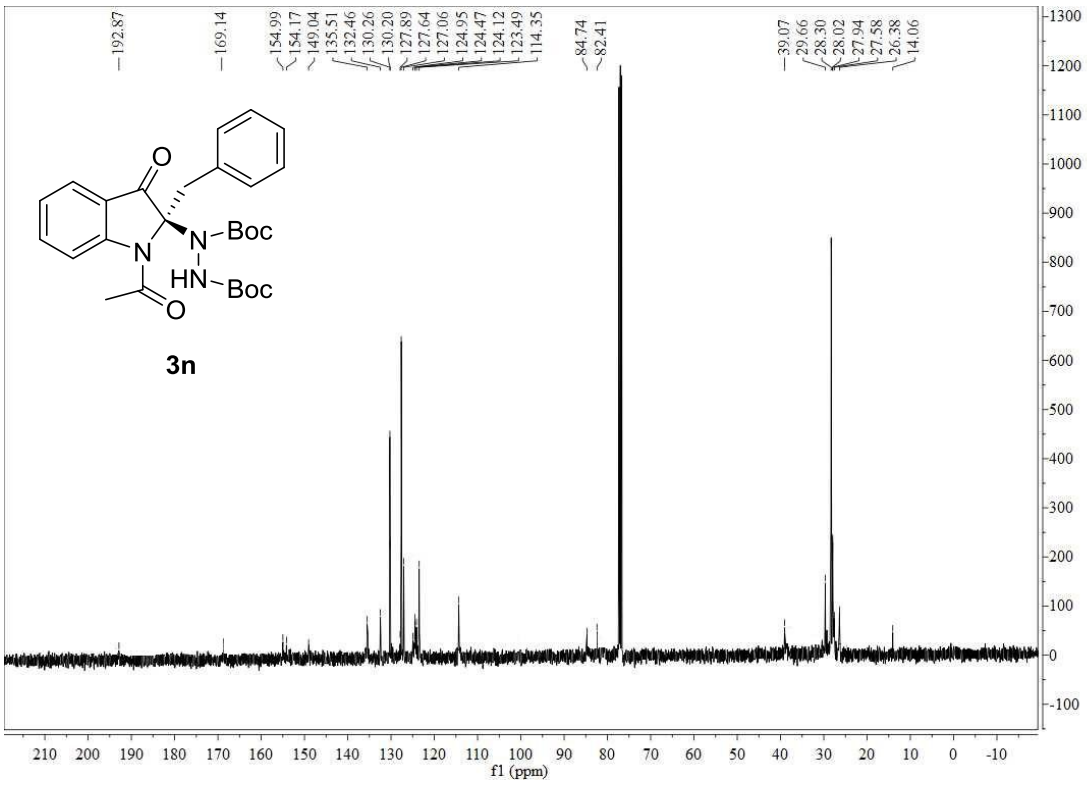
3l


7.71
7.69
7.67
7.66
7.53
7.52
7.41
7.38
7.36
7.20
7.19
7.17
7.17
7.16
7.15
7.14
7.12
7.06
2.56
2.54
1.55
1.34
1.33
1.31
O
Ph
N
Boc
N
HN
Boc
Cl
O
3m
1.21
3.04
1.19
3.09
1.17
3.00
3.25
15.22
f1 (ppm)

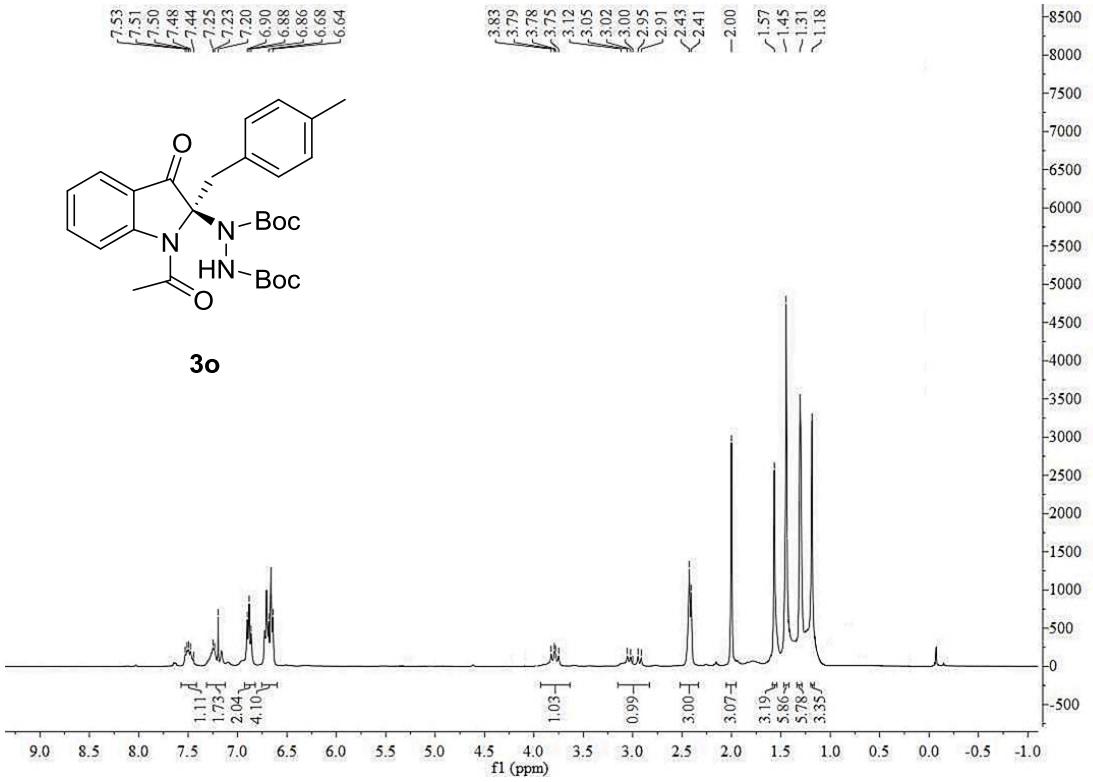

189.95
169.10
154.31
153.88
149.17
135.91
131.20
129.37
129.07
128.19
128.16
127.61
127.35
126.16
125.76
124.60
115.86
82.88
80.07
29.68
28.37
28.13
27.93
27.84
25.59
25.24
O
Ph
N
Boc
N
HN
Boc
Cl
O
3m
f1 (ppm)

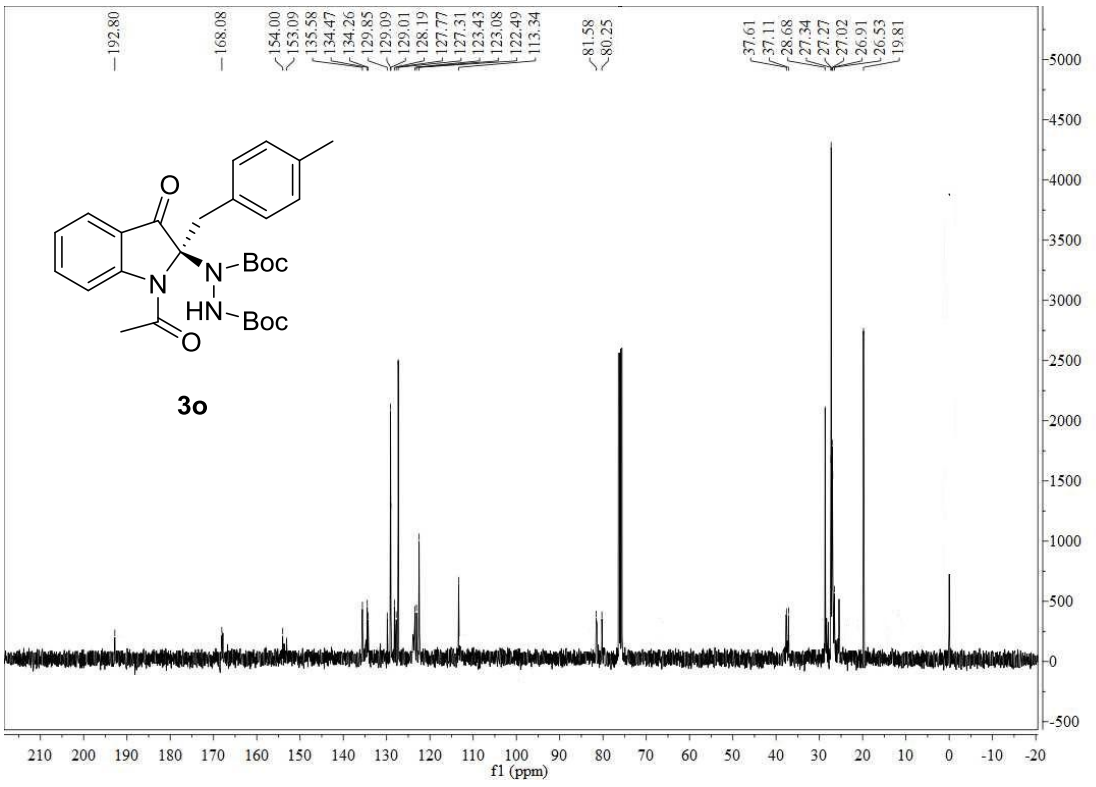

7.60
7.59
7.57
7.55
7.38
7.36
7.35
7.30
7.26
6.99
6.98
6.97
6.93
6.91
6.88
3.95
3.94
3.92
3.91
3.18
3.14
3.07
3.04
2.51
2.49
1.66
1.54
1.40
1.27
O
N
N-Boc
HN-Boc
O
1.00
1.37
7.25
1.00
1.00
2.97
3.11
11.87
2.90
f1 (ppm)

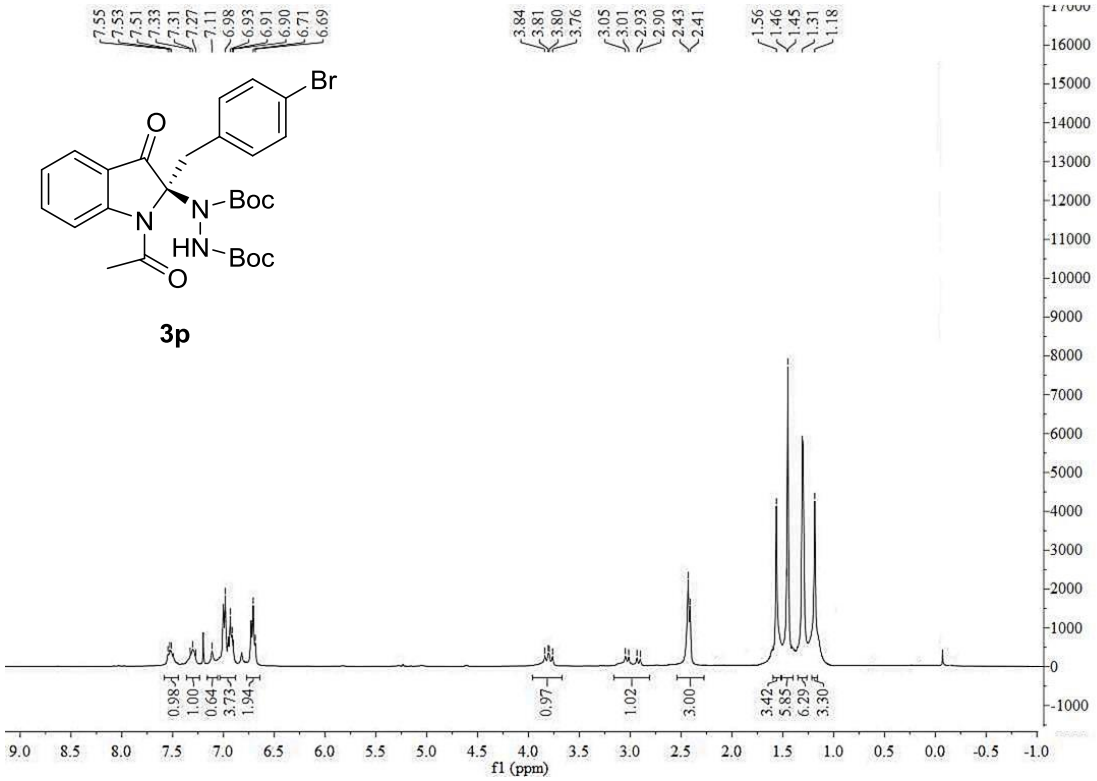
3n


192.87
169.14
154.99
154.17
149.04
135.51
132.46
130.26
130.20
127.89
127.64
127.06
124.95
124.47
124.12
123.49
114.35
84.74
82.41
39.07
29.66
28.30
28.02
27.94
27.58
26.38
14.06
O
N
N-Boc
HN-Boc
O
f1 (ppm)

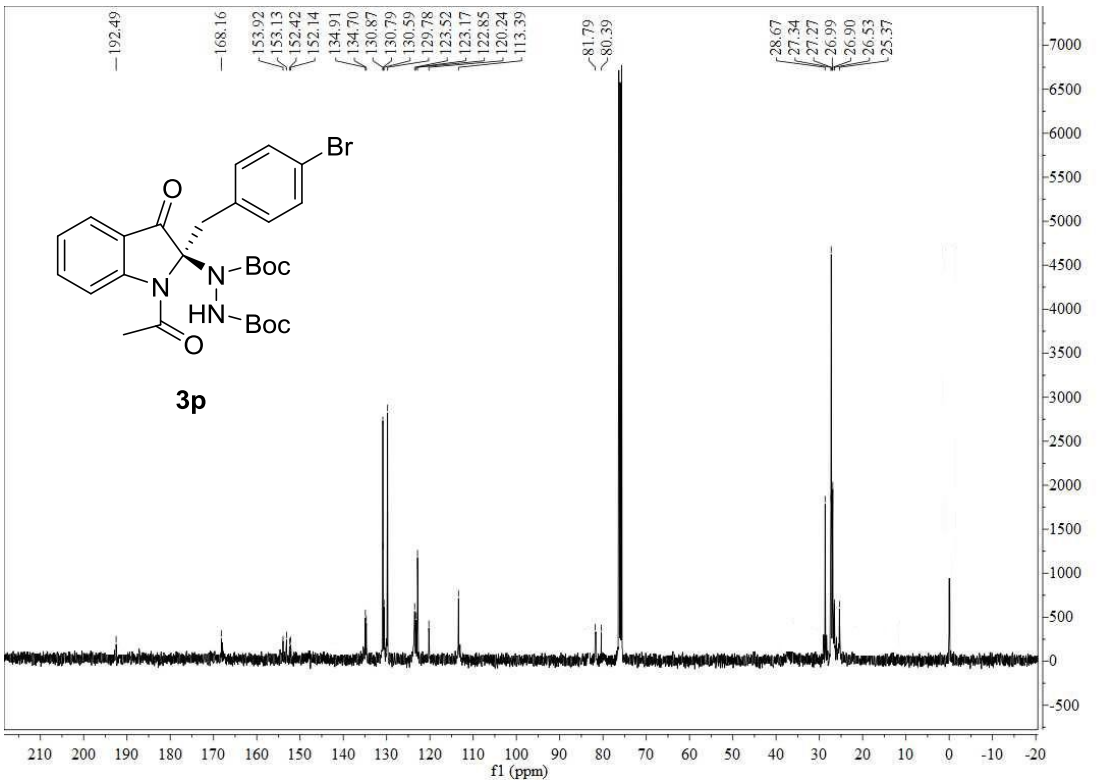
3n


7.53
7.51
7.50
7.48
7.44
7.25
7.23
7.20
6.90
6.88
6.86
6.68
6.64
3.83
3.79
3.78
3.75
3.12
3.05
3.02
3.00
2.95
2.91
2.43
2.41
2.00
1.57
1.45
1.31
1.18
O
N
Boc
N
HN
Boc
O
3o
1.11
1.73
2.04
4.10
1.03
0.99
3.00
3.07
3.19
5.86
5.78
3.35
f1 (ppm)

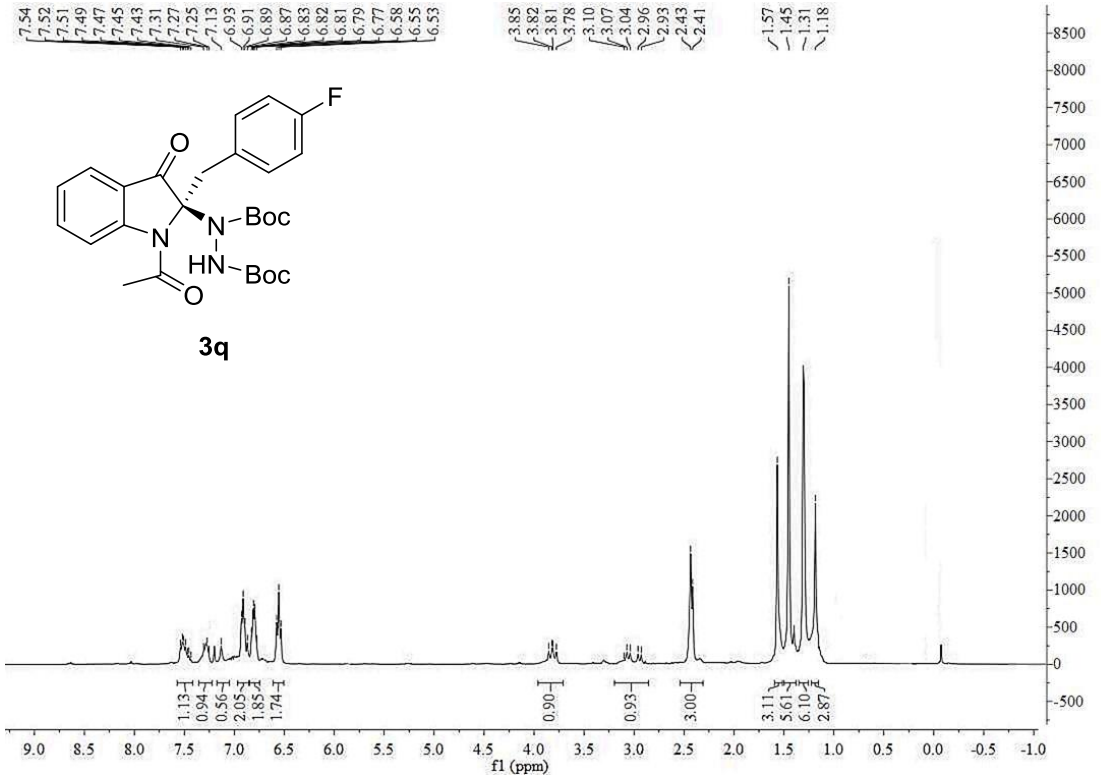

192.80
168.08
154.00
153.09
135.58
134.47
134.26
129.85
129.09
129.01
128.19
127.77
127.31
123.43
123.08
122.49
113.34
81.58
80.25
37.61
37.11
28.68
27.34
27.27
27.02
26.91
26.53
19.81
O
N
Boc
N
HN
Boc
O
3o
f1 (ppm)

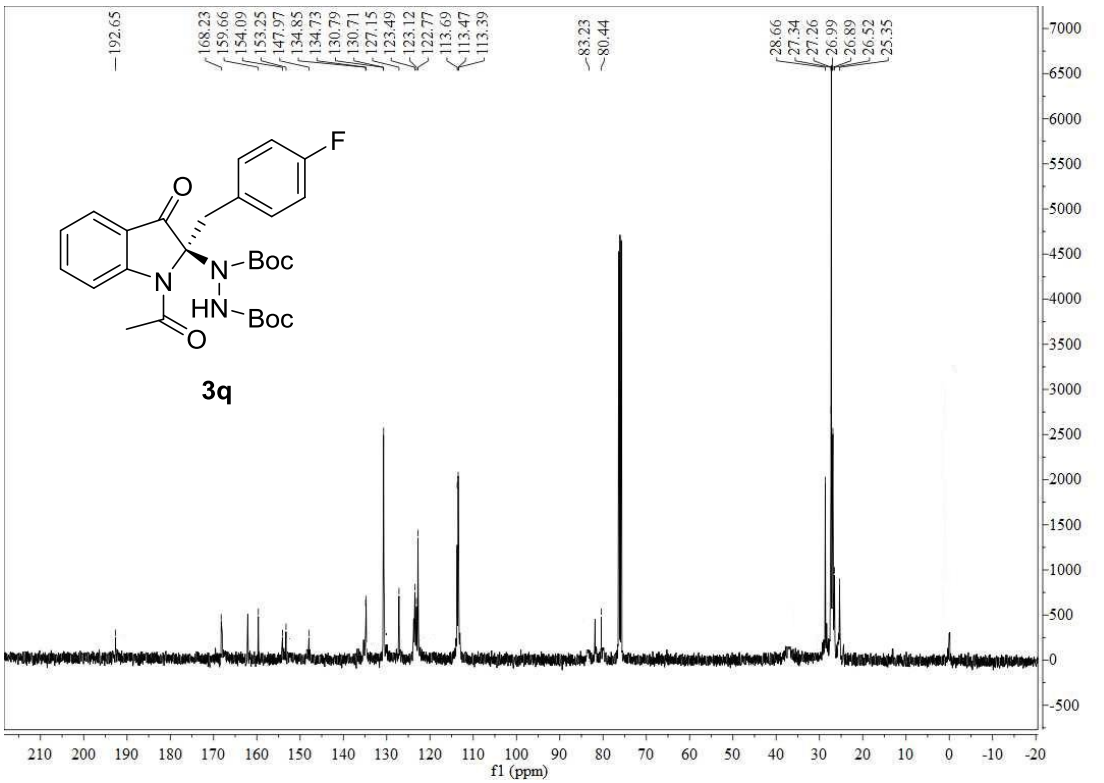

7.55
7.53
7.51
7.33
7.31
7.27
7.11
6.98
6.93
6.91
6.90
6.71
6.69
3.84
3.81
3.80
3.76
3.05
3.01
2.93
2.90
2.43
2.41
1.56
1.46
1.45
1.31
1.18
Br
O
N
N
Boc
HN
Boc
O
0.98
1.00
0.64
3.73
1.94
0.97
1.02
3.00
3.42
5.85
6.29
3.30
f1 (ppm)

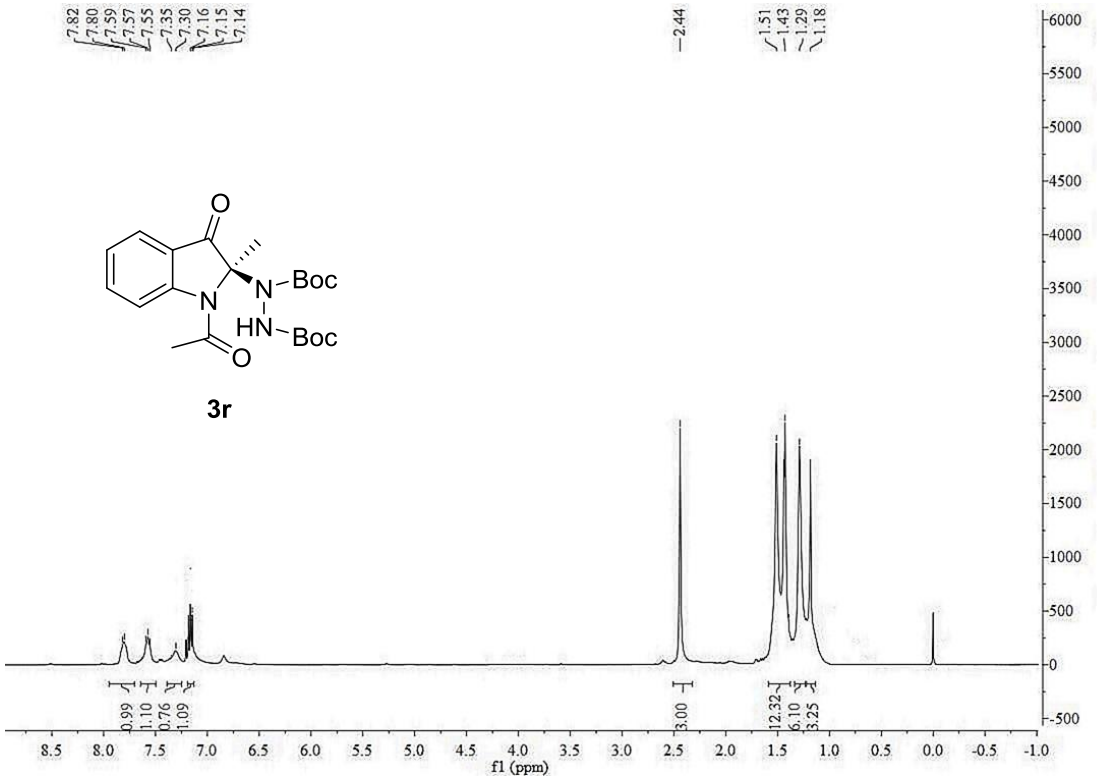
3p


192.49
168.16
153.92
153.13
152.42
152.14
134.91
134.70
130.87
130.79
130.59
129.78
123.52
123.17
122.85
120.24
113.39
81.79
80.39
28.67
27.34
27.27
26.99
26.90
26.53
25.37
Br
O
N
N
Boc
HN
Boc
O
f1 (ppm)

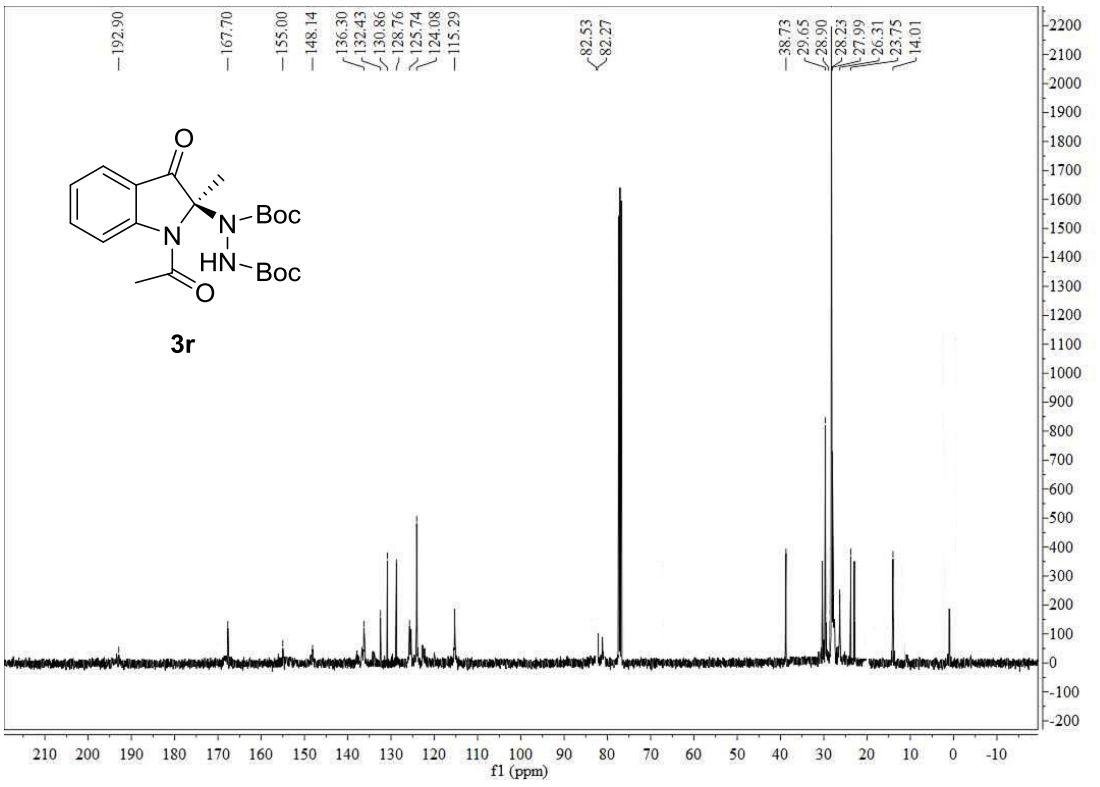
3p


F
O
N
N–Boc
HN–Boc
O
3q
f1 (ppm)

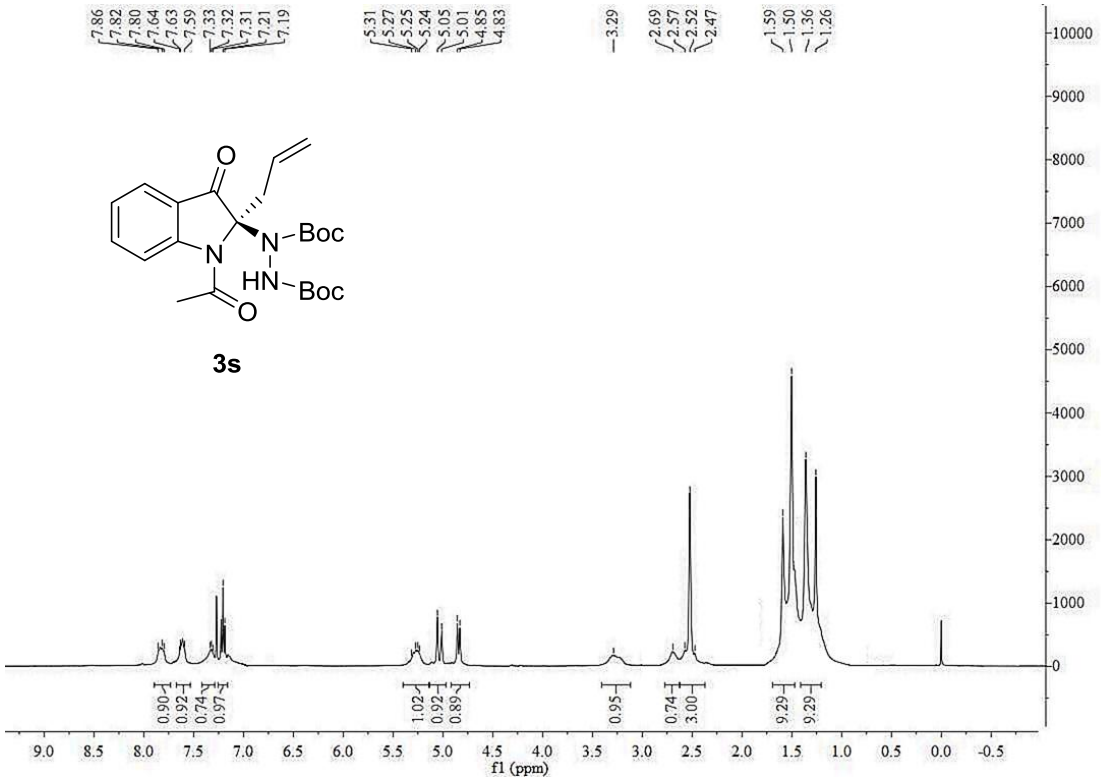

F
O
N
N–Boc
HN–Boc
O
3q
f1 (ppm)


7.82
7.80
7.59
7.57
7.55
7.35
7.30
7.16
7.15
7.14
2.44
1.51
1.43
1.29
1.18
O
N
N
Boc
HN
Boc
O
0.99
1.10
0.76
1.09
3.00
12.32
6.10
3.25
f1 (ppm)

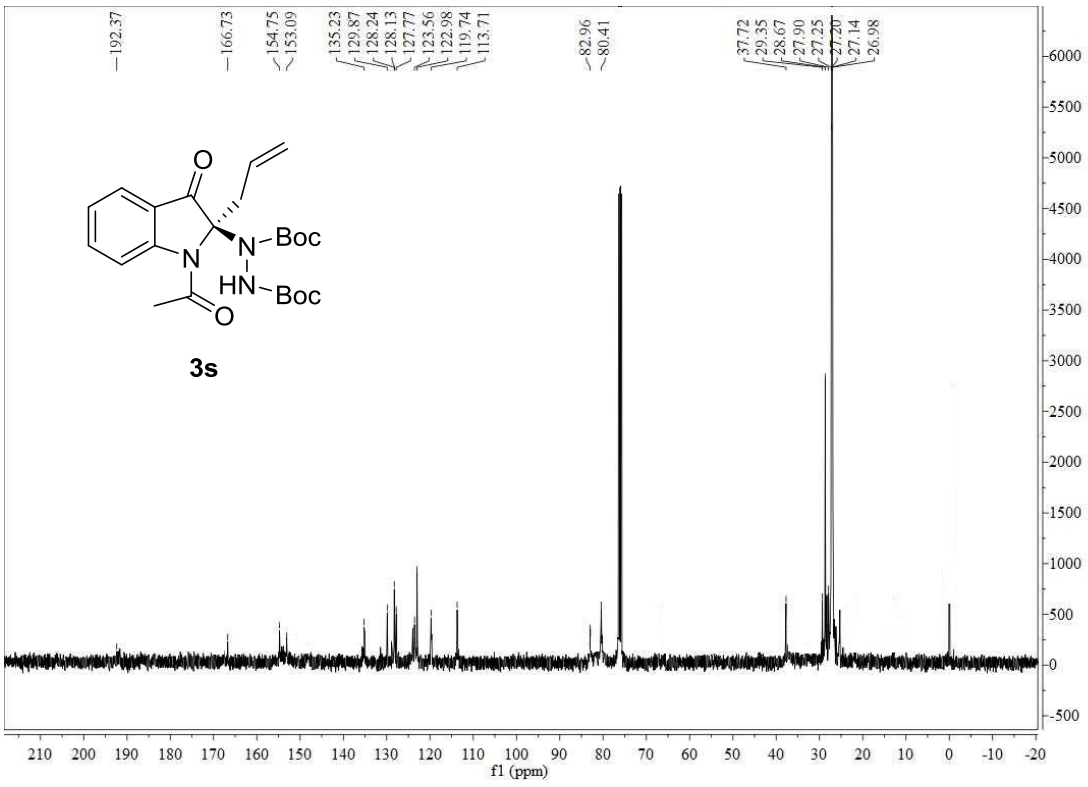
3r


192.90
167.70
155.00
148.14
136.30
132.43
130.86
128.76
125.74
124.08
115.29
82.53
82.27
38.73
29.65
28.90
28.23
27.99
26.31
23.75
14.01
O
N
N
Boc
HN
Boc
O
f1 (ppm)

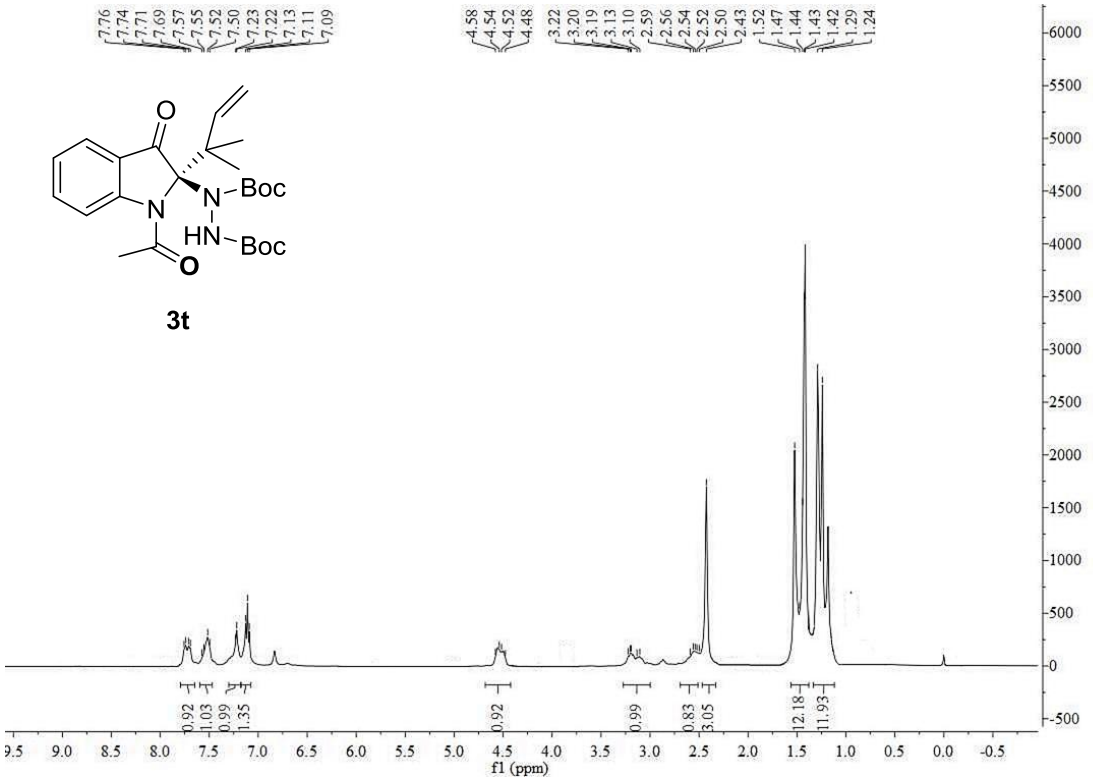
3r

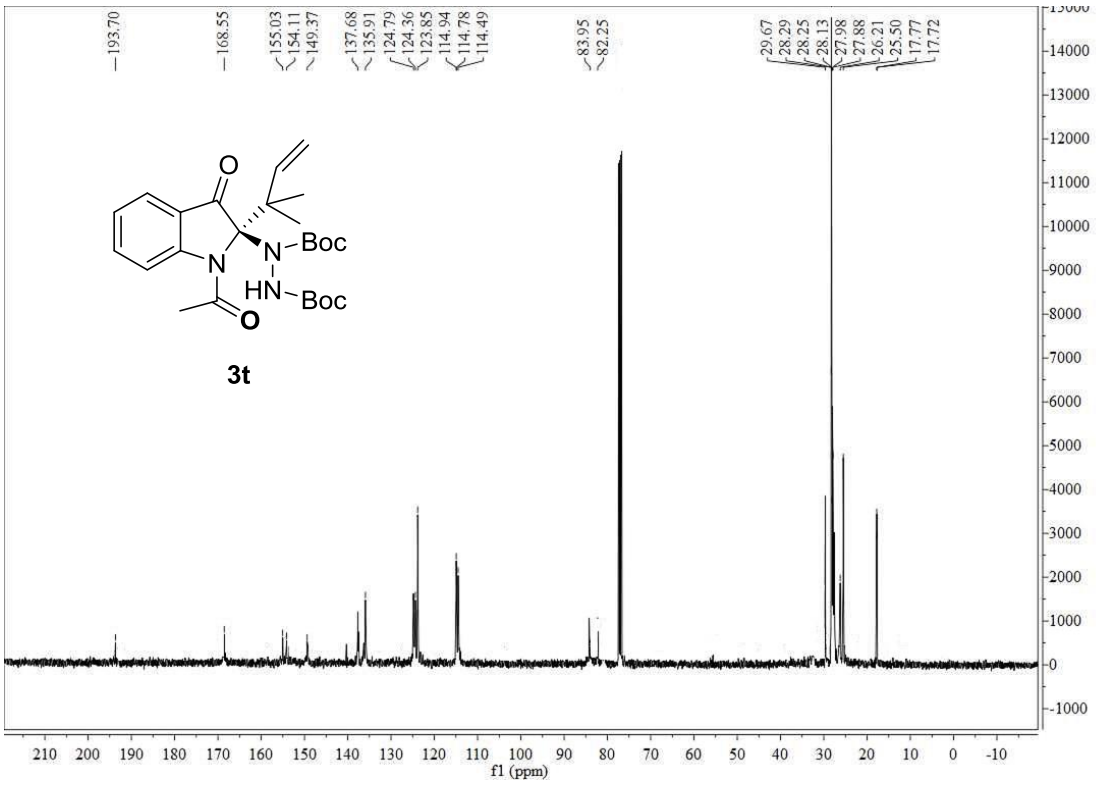

7.86
7.82
7.80
7.64
7.63
7.59
7.33
7.32
7.31
7.21
7.19
5.31
5.27
5.25
5.24
5.05
5.01
4.85
4.83
3.29
2.69
2.57
2.52
2.47
1.59
1.50
1.36
1.26
O
N
N
Boc
HN
Boc
O
0.90
0.92
0.74
0.97
1.02
0.92
0.89
0.95
0.74
3.00
9.29
9.29
f1 (ppm)

3s

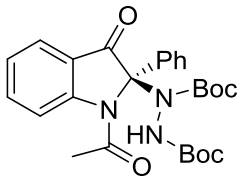

192.37
166.73
154.75
153.09
135.23
129.87
128.24
128.13
127.77
123.56
122.98
119.74
113.71
82.96
80.41
37.72
29.35
28.67
27.90
27.25
27.20
27.14
26.98
O
N
N
Boc
HN
Boc
O
f1 (ppm)

3s

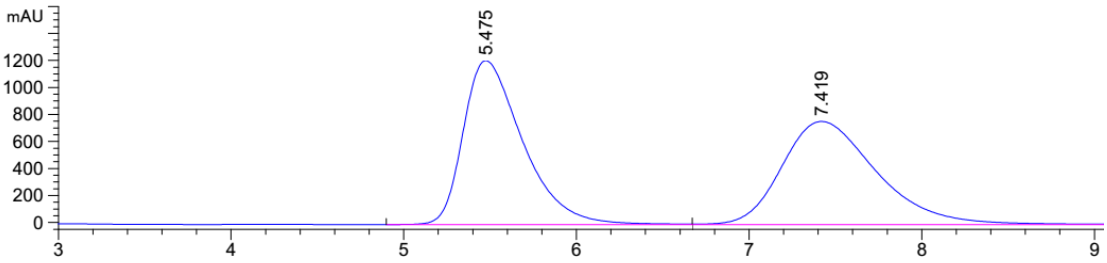

7.76
7.74
7.71
7.69
7.57
7.55
7.52
7.50
7.23
7.22
7.13
7.11
7.09
4.58
4.54
4.52
4.48
3.22
3.20
3.19
3.13
3.10
2.59
2.56
2.54
2.52
2.50
2.43
1.52
1.47
1.44
1.43
1.42
1.29
1.24
O
N
N
Boc
HN
Boc
O
3t
0.92
1.03
0.99
1.35
0.92
0.99
0.83
3.05
12.18
11.93
f1 (ppm)


193.70
168.55
155.03
154.11
149.37
137.68
135.91
124.79
124.36
123.85
114.94
114.78
114.49
83.95
82.25
29.67
28.29
28.25
28.13
27.98
27.88
26.21
25.50
17.77
17.72
O
N
N
Boc
HN
Boc
O
3t
f1 (ppm)

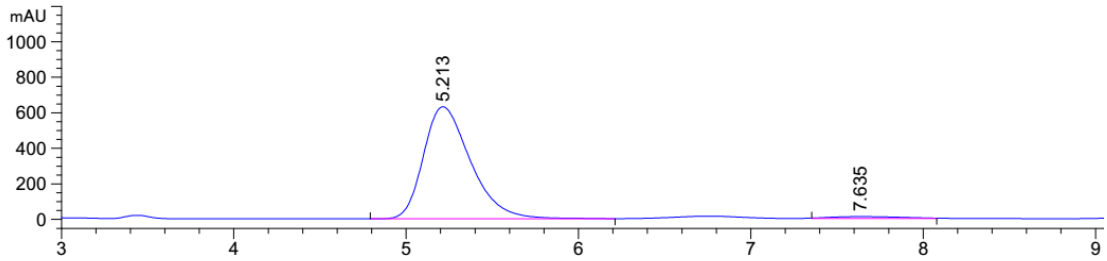
4 HPLC traces for 3a-3t



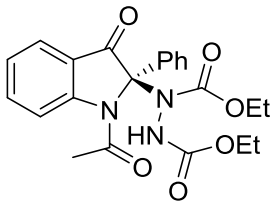
3a



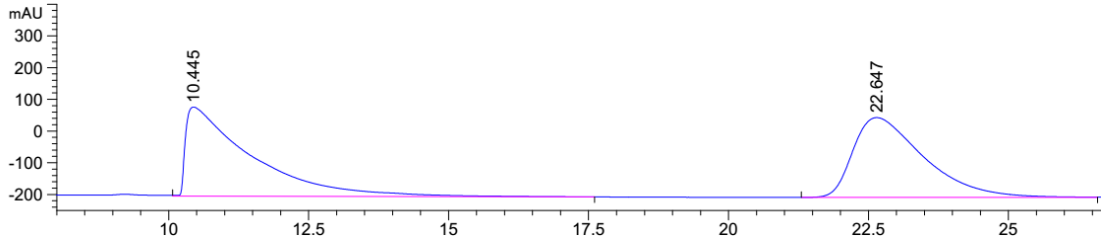
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.475	BB	0.3632	2.90537e4	1213.86865	50.0702
2	7.418	BB	0.5833	2.89722e4	762.42694	49.9298



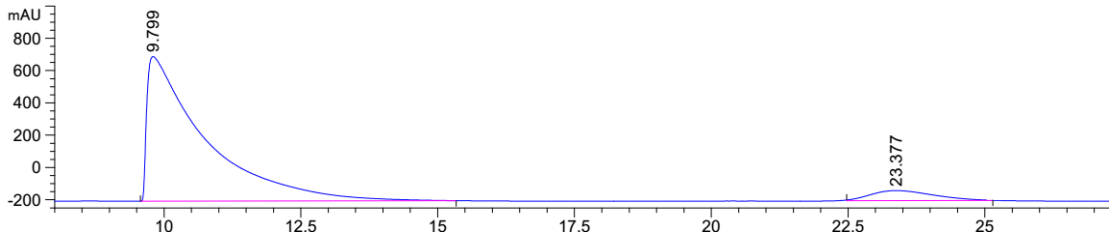
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.213	VV	0.2943	1.20327e4	631.38519	97.4957
2	7.635	MM R	0.4896	309.07376	10.52110	2.5043



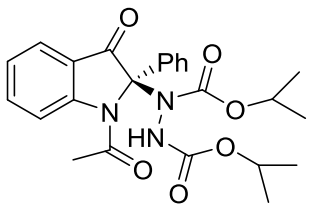
3b



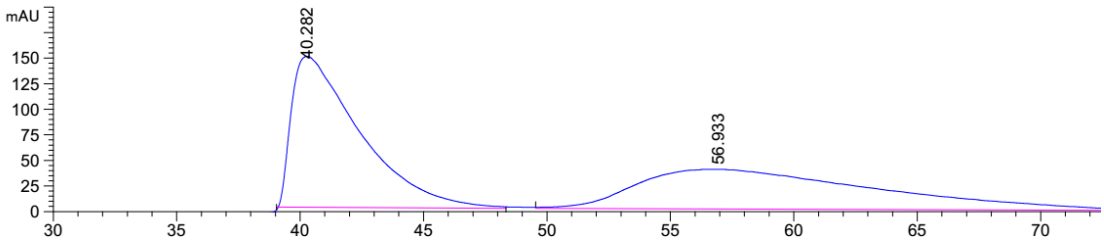
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	10.444	BB	1.0397	2.17083e4	278.39014	50.0554
2	22.646	BB	1.3013	2.16602e4	250.86470	49.9446



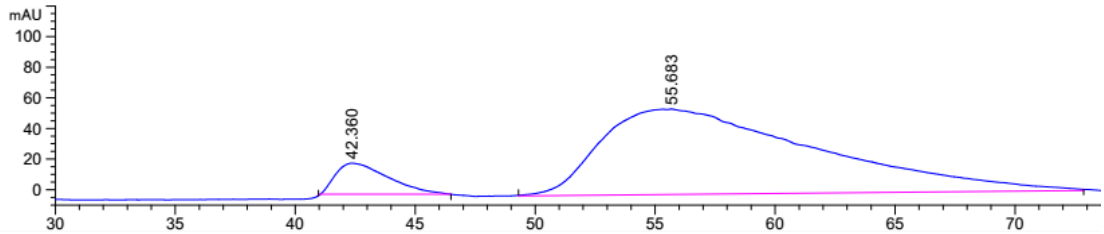
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	9.798	MM	1.2261	6.58860e4	895.61285	93.0197
2	23.377	MM	1.3220	4944.12598	62.33075	6.9803



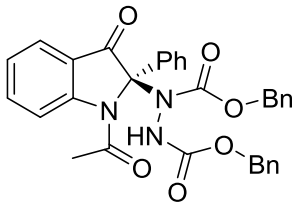
3c



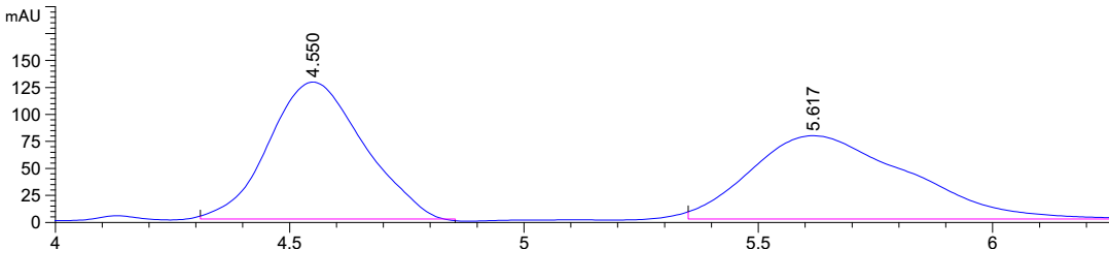
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	40.282	MM R	3.2119	2.84802e4	147.78374	52.3896
2	56.933	MM R	11.1141	2.58821e4	38.81271	47.6104



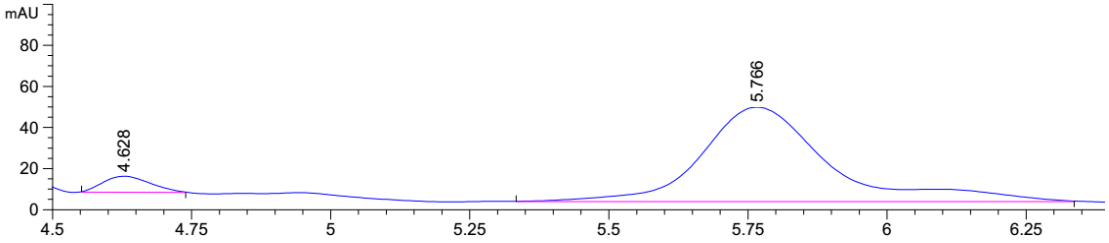
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	42.360	MM R	2.5412	3075.34863	20.17006	8.1474
2	55.683	MM R	10.3586	3.46709e4	55.78432	91.8526



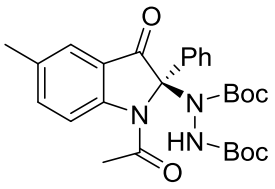
3d



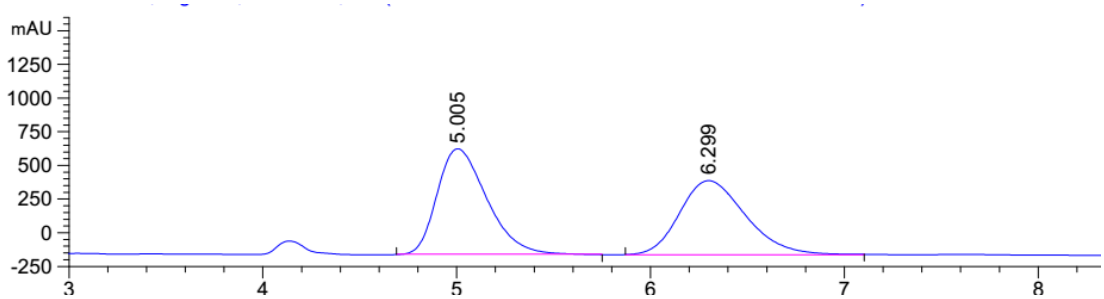
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.550	MM R	0.2346	1789.01306	127.08457	49.5577
2	5.617	MM R	0.3926	1820.94373	77.29569	50.4423



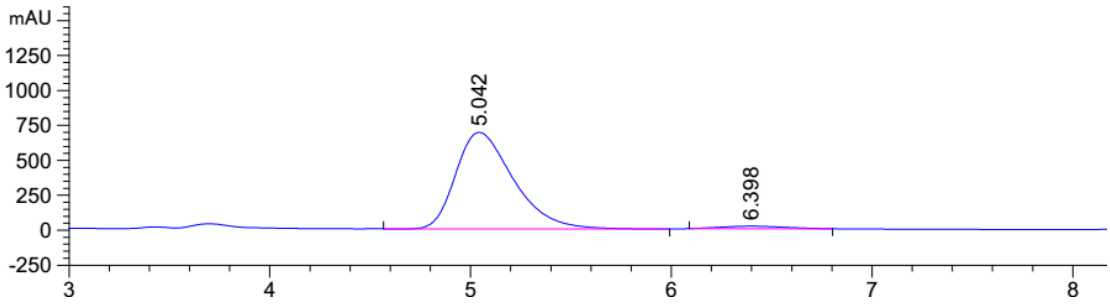
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.628	MM R	0.0975	45.45885	7.76950	5.8631
2	5.766	MM R	0.2643	729.88220	46.01999	94.1369



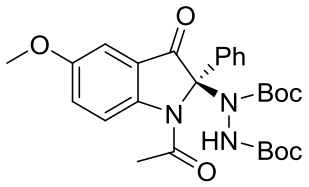
3e



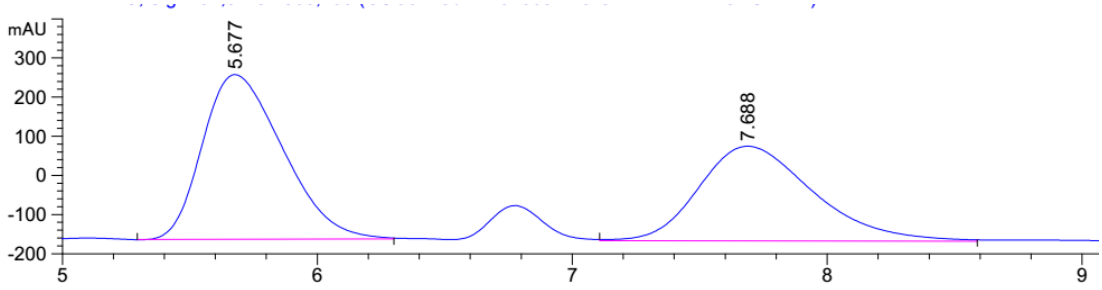
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.005	MM	0.2965	1.39412e4	783.62366	51.6834
2	6.299	MM	0.3950	1.30330e4	549.86566	48.3166



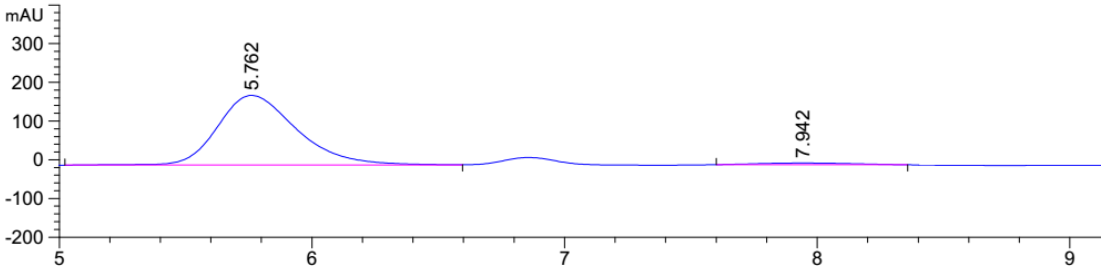
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.042	MM R	0.3329	1.38209e4	691.87421	96.8510
2	6.398	MM R	0.3898	449.37311	19.21361	3.1490



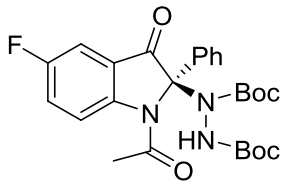
3f



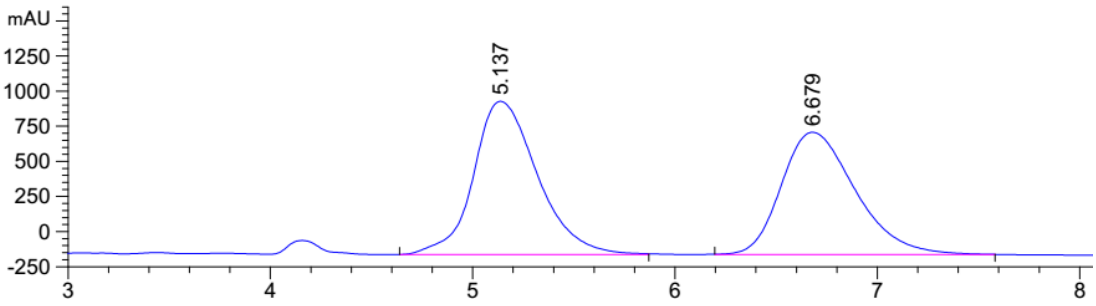
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.677	MM R	0.3404	8259.19922	404.41907	50.8980
2	7.688	MM R	0.5370	7967.75195	247.30482	49.1020



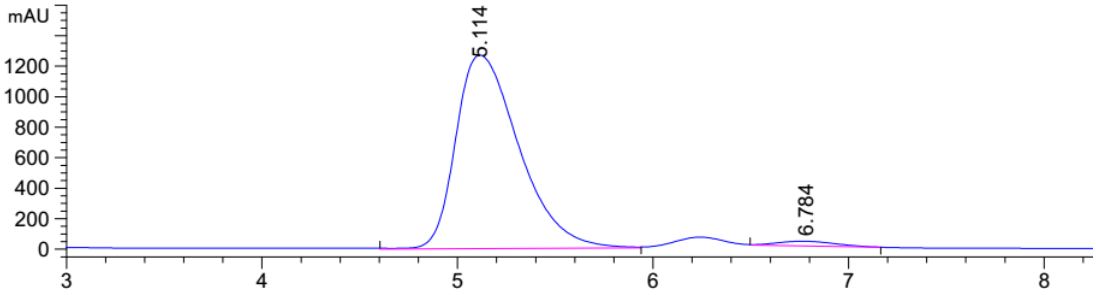
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.761	MM	0.3636	3928.06445	180.04416	97.1012
2	7.942	MM	0.4405	117.26672	4.43736	2.8988



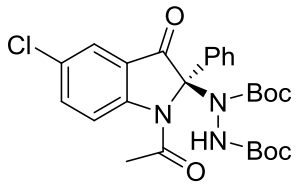
3g



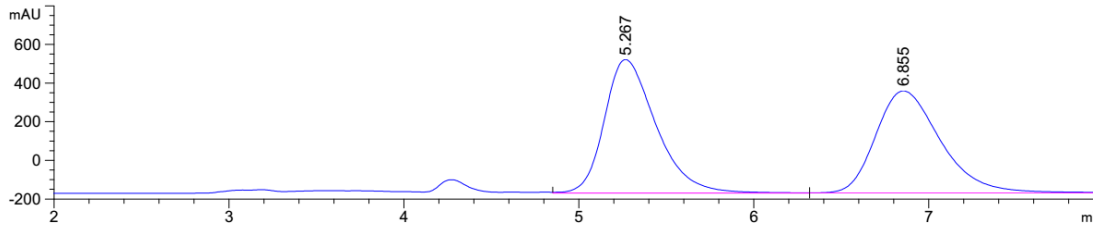
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.137	MM R	0.3534	2.28232e4	1076.42480	50.2753
2	6.679	MM R	0.4300	2.25732e4	874.91064	49.7247



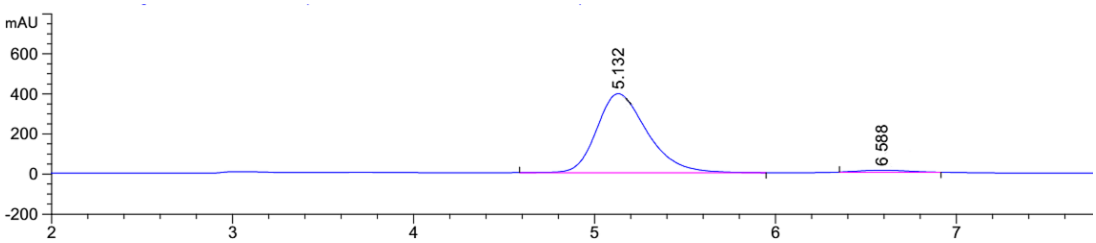
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.114	MM R	0.3745	2.85028e4	1268.37476	97.8783
2	6.784	MM R	0.3382	617.85724	30.44529	2.1217



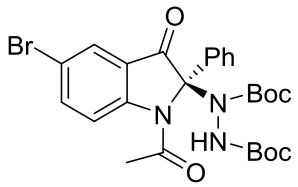
3h



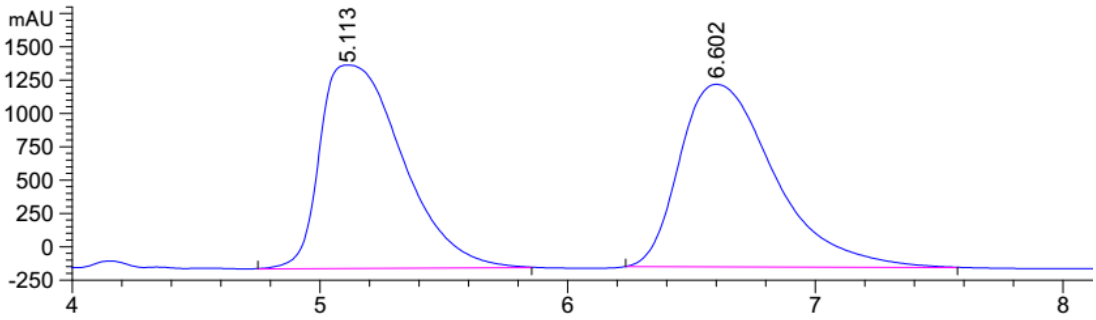
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.266	VB	0.3136	1.41965e4	691.39899	50.9969
2	6.855	BB	0.3973	1.36415e4	528.25854	49.0031



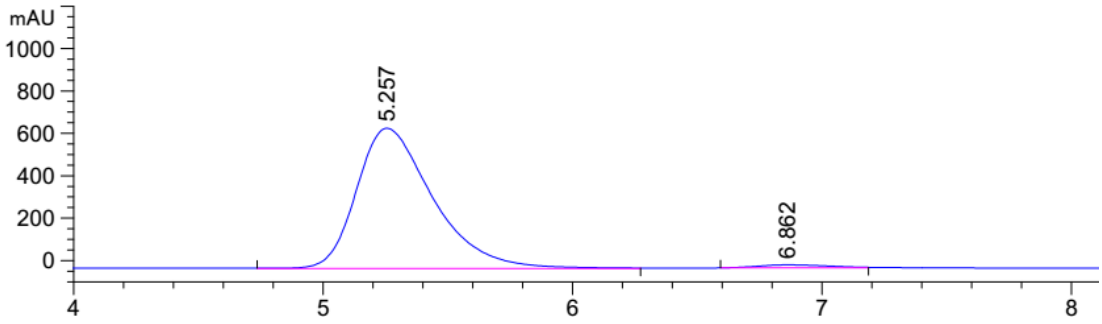
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.132	MM	0.3249	7692.56689	394.65396	97.5495
2	6.588	MM	0.3153	193.24551	10.21428	2.4505



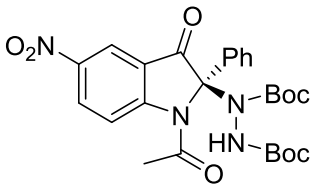
3i



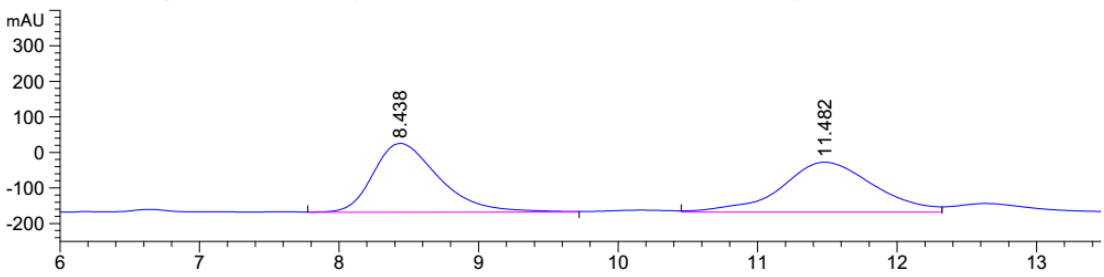
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.113	MM	0.3860	3.53676e4	1527.16895	49.2704
2	6.602	MM	0.4428	3.64152e4	1370.51233	50.7296



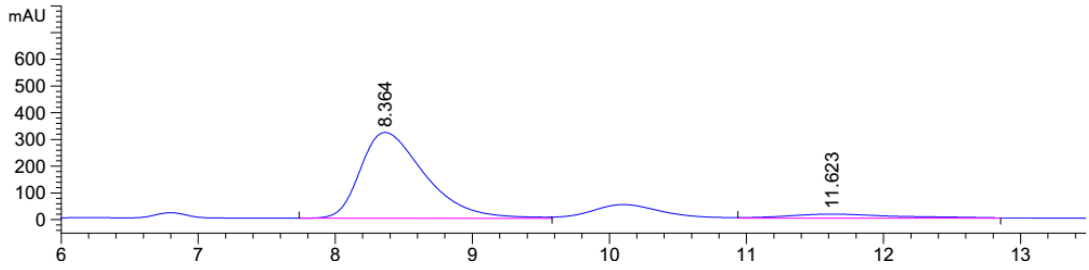
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.257	MM	0.3545	1.40609e4	661.01965	97.9445
2	6.862	MM	0.3387	295.09229	14.51962	2.0555



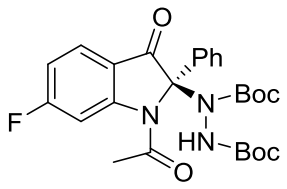
3j



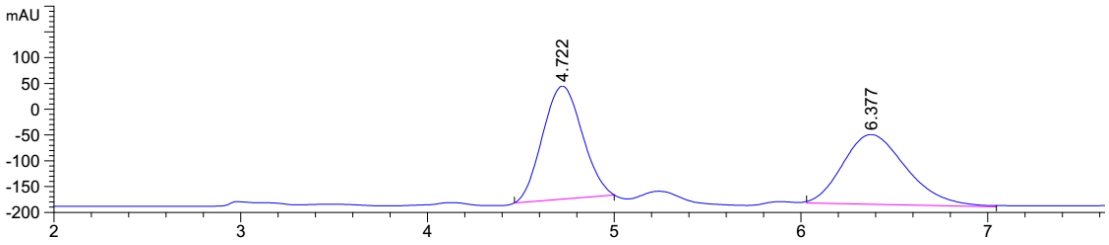
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.437	BB	0.4961	6245.56836	192.71332	49.2511
2	11.481	VV	0.6981	6435.51025	139.51872	50.7489



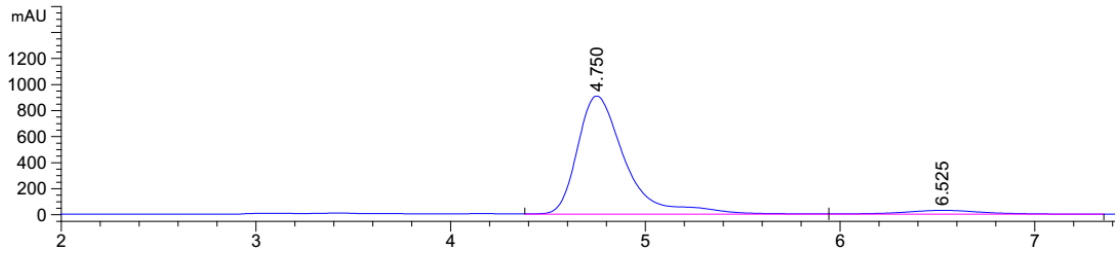
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.364	MM	0.5474	1.05672e4	321.76361	92.9757
2	11.622	MM	0.9040	798.35547	14.71857	7.0243



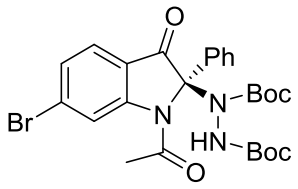
3k



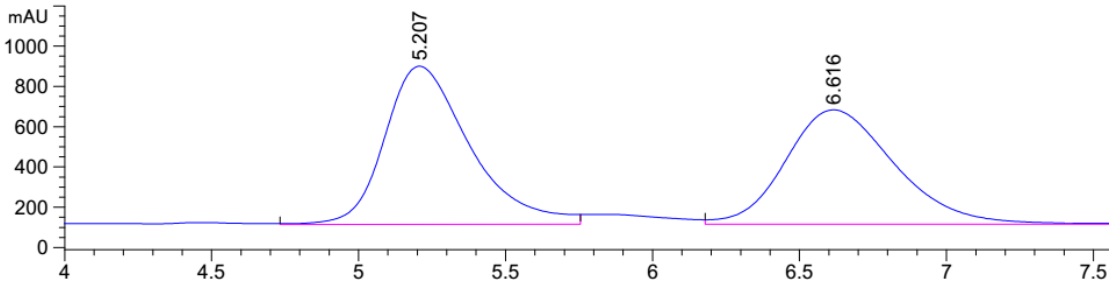
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.722	MM R	0.2459	3235.48779	219.32024	50.3168
2	6.377	MM R	0.3943	3194.74707	135.04497	49.6832



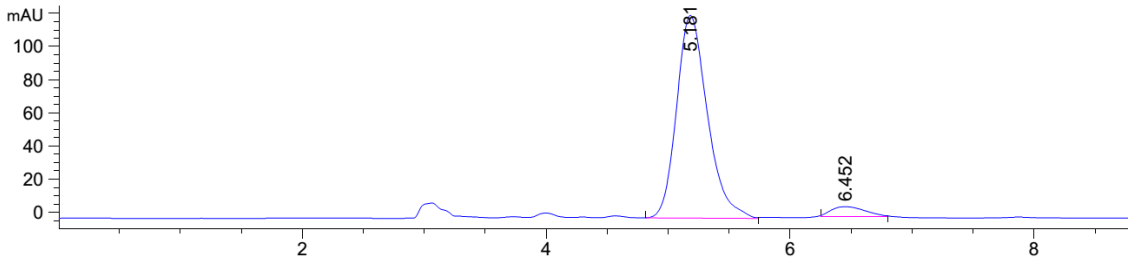
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.750	MM	0.2859	1.55755e4	907.85260	97.4857
2	6.524	MM	0.3181	401.71851	21.04676	2.5143



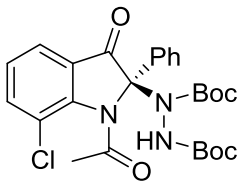
3l



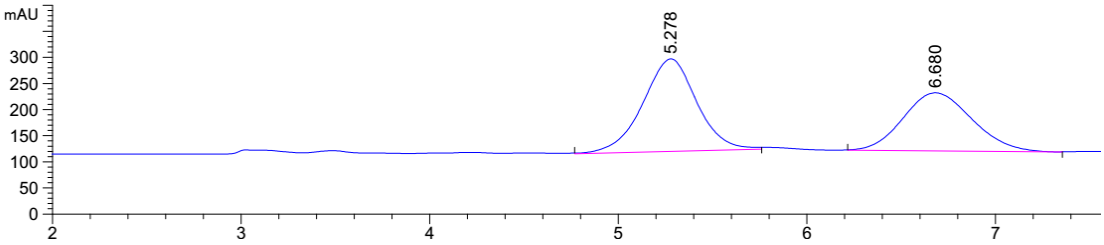
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.207	MM R	0.3126	1.43114e4	762.95508	50.1860
2	6.616	MM R	0.4226	1.42053e4	560.21960	49.8140



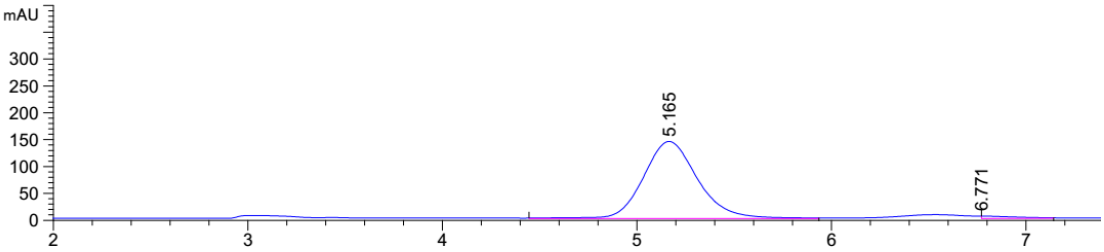
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.181	MM	0.2924	2144.73047	122.26463	94.9271
2	6.452	MM	0.3233	114.61462	5.90813	5.0729



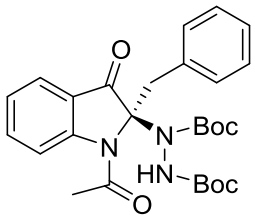
3m



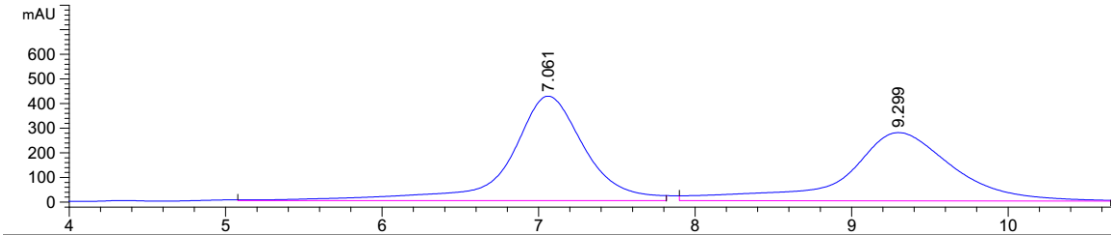
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.278	MM	0.3324	3536.22437	177.31744	55.4871
2	6.680	MM	0.4242	2836.83594	111.46307	44.5129



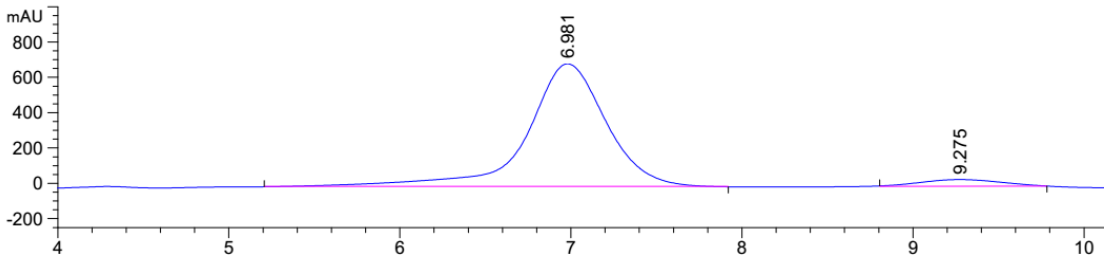
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.165	MM	0.3236	2783.13013	143.32652	98.0884
2	6.771	MM	0.2022	54.23851	4.47177	1.9116



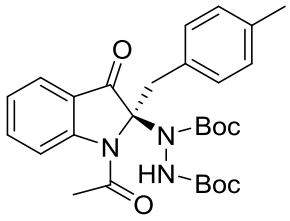
3n



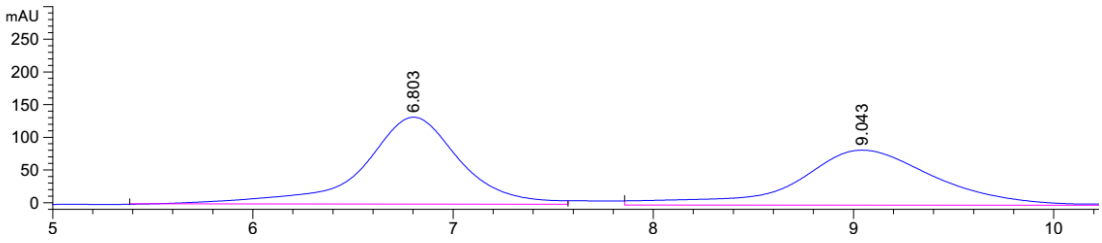
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.061	MM R	0.4827	1.17346e4	405.14465	50.1823
2	9.299	MM R	0.7241	1.16493e4	268.12674	49.8177



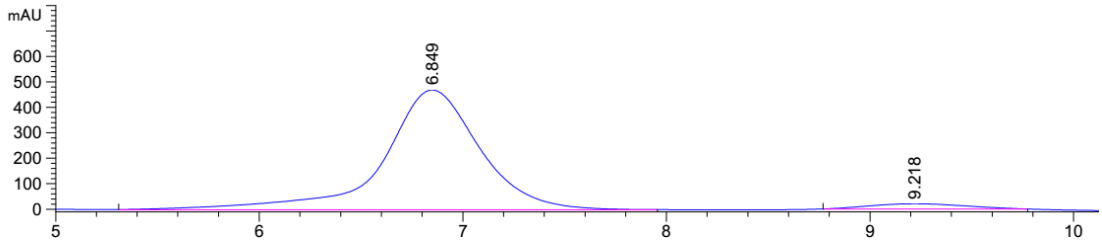
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	6.981	MM	0.5346	2.22634e4	694.03503	94.8631
2	9.275	MM	0.5362	1205.56653	37.47159	5.1369



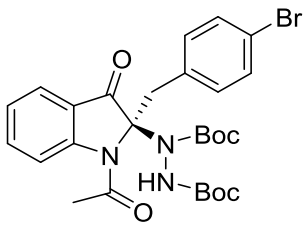
3o



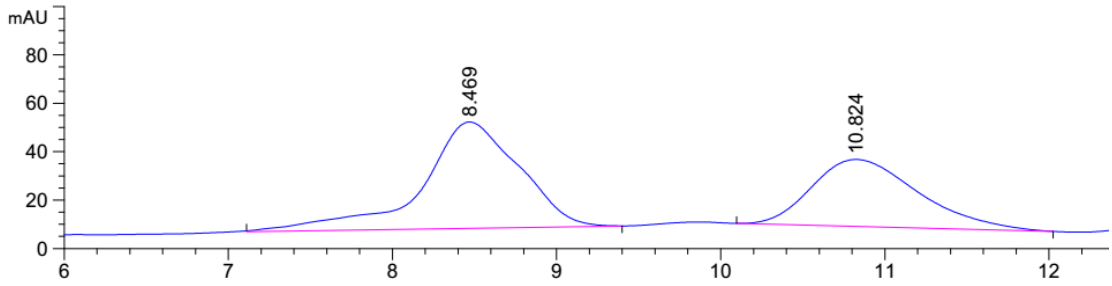
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	6.802	MM R	0.4705	3467.01147	122.80345	50.0761
2	9.049	MM R	0.7174	3456.46997	80.30141	49.9239



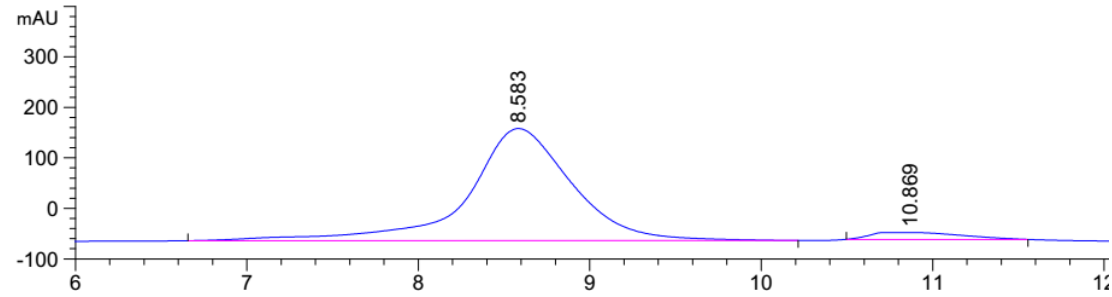
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	6.849	MM	0.5507	1.55403e4	470.32043	95.9139
2	9.218	MM	0.5392	662.04492	20.46514	4.0861



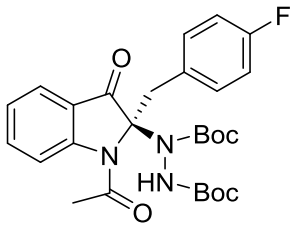
3p



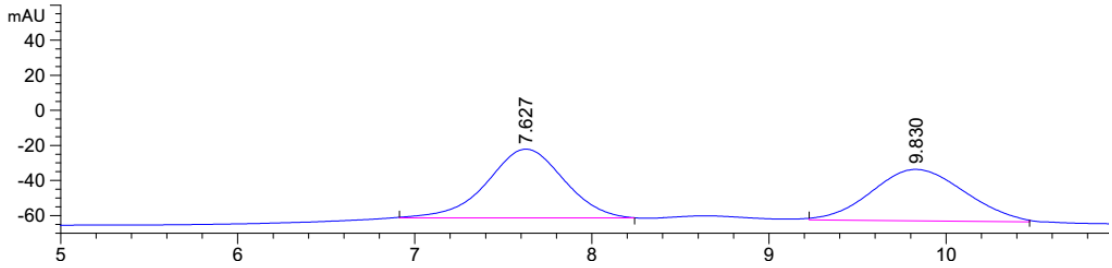
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.472	MM R	0.5755	1384.29114	40.09034	50.3920
2	10.832	MM R	0.7963	1362.75439	28.52396	49.6080



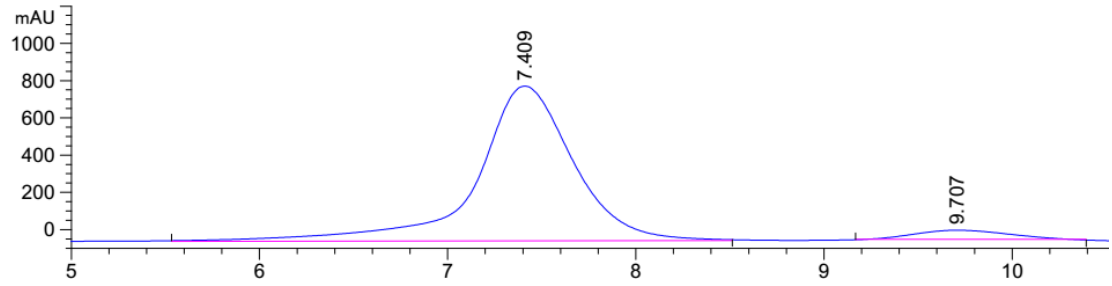
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.583	MM	0.7083	9436.33496	222.03900	94.8117
2	10.869	MM	0.6181	516.37213	13.92419	5.1883



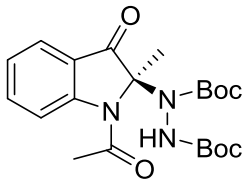
3q



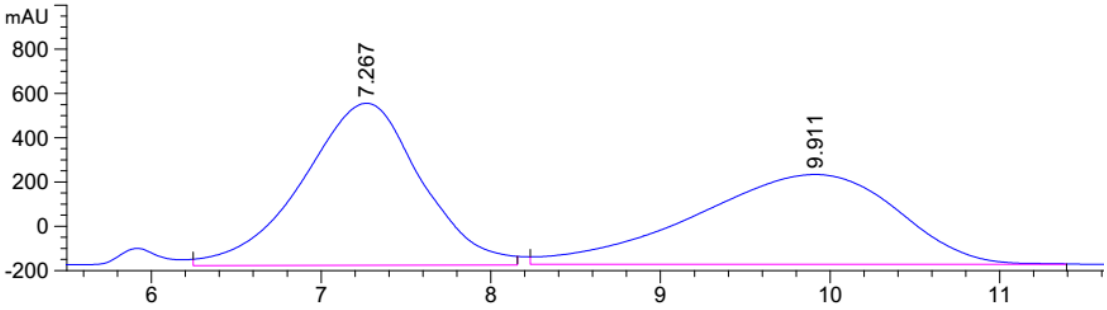
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.627	MM R	0.5120	1220.99011	39.74861	50.2640
2	9.830	MM R	0.6608	1208.16296	30.47238	49.7360



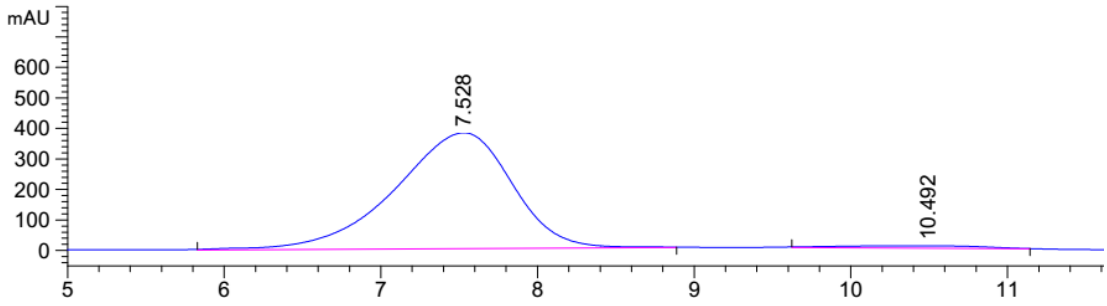
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.409	MM	0.5980	2.98268e4	831.33026	94.6061
2	9.707	MM	0.5740	1700.55713	49.38013	5.3939



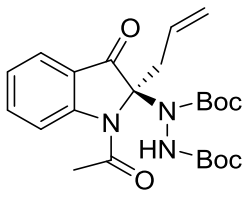
3r



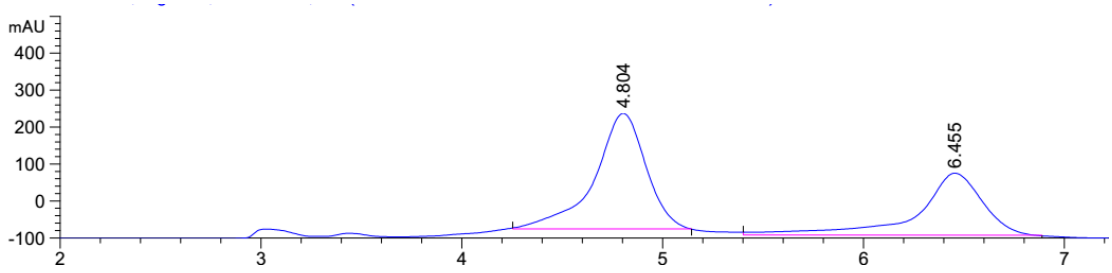
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.267	MM R	0.7587	3.17732e4	697.98547	50.7807
2	9.922	MM R	1.3117	3.07962e4	391.31177	49.2193



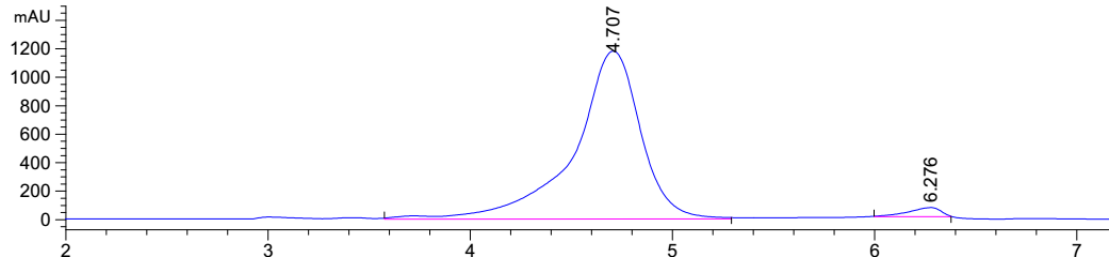
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.528	MM	0.8696	1.98342e4	380.14243	97.5665
2	10.492	MM	1.0500	494.70456	7.85283	2.4335



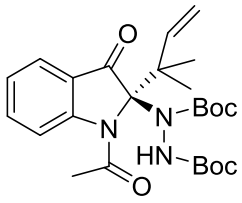
3s



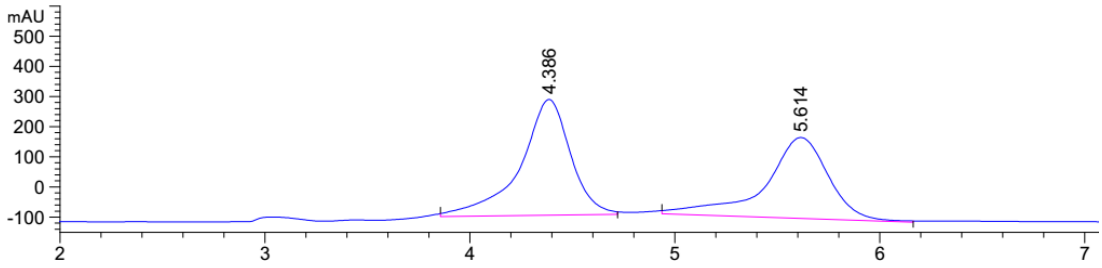
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.804	MM R	0.2371	3863.39307	271.58505	50.3298
2	6.455	MM R	0.3734	3812.75854	170.19043	49.6702



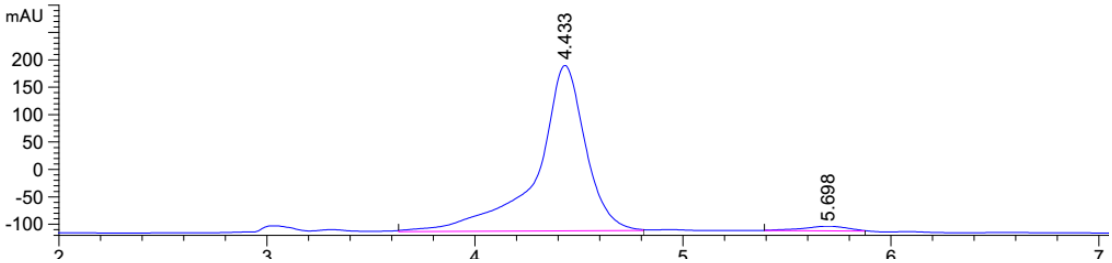
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.707	MM	0.3830	2.70933e4	1178.91003	97.4298
2	6.276	MM	0.1862	714.73370	63.97007	2.5702



3t



峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.386	MM R	0.2609	5596.20313	357.50525	50.1913
2	5.614	MM R	0.3477	5553.53320	266.18558	49.8087



峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.433	MM	0.2721	4933.94727	302.18295	97.5113
2	5.698	MM	0.2470	125.92263	8.49837	2.4887